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E METHOD OF CHRIST

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Chemistry, Physics & Spectrum Analysis,

BY

JOHN COUTTS.

AUTHOR OF

n's Organic Constitution," "*Brain and Intellect,*" "*The Seven Principles,*"
"*The Tree of Life,*" "*Christ's Kingdom and the Higher Criticism,*"
"*The Spirit of Truth as Revealed in Law,*"
&c., &c.

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In this pamphlet the laws, or the Method of Christ's Kingdom, are applied to the physical world. The hope is cherished that this effort will carry the enquiry as to the harmony found in the Bible, nature and man, another stage forward. Probably the line of thought taken may stimulate enquiry and receive the careful consideration of religious teachers and scientific workers. The results here reached, in the study of Evolution and Agnosticism, are commended for the consideration of all lovers of truth and righteousness.

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10*th February*, 1903.

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TO THE

METHOD OF CHRIST'S KINGDOM

AND THE

WORK OF THE HOLY SPIRIT.

BY JOHN COUTTS.

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,, III. THE METHOD OF CHRIST IN THE PSYCHICAL WORLD.
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,, V. THE METHOD OF CHRIST IN THE BIBLE.
,, VI. SUMMATION AND CONCLUSION.

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them.

Men will seek for God, the God of life and truth, and until they find Him there is no rest; and whether men know it or not, this is as true intellectually as it is spiritually. Is not this the great truth that underlies experience, science, philosophy and religion? All who think truly, seriously, are seekers after God, and they are seeking Him by the ways of faith, truth, life and love; faith is the atmosphere in which the soul lives; the way to God is by the light of Truth, and in that way there is found the true life, and self-sacrificing divine love.

The subject of the Divine transcendence of the Blessings uttered by Christ as the means of revealing the way of life for sinful men deserves special study. Thus to see Christ is to see Him as central throughout the universe; and, by His words of Blessing, He offers to men the key that will unlock the mysteries to be found in the natural and spiritual worlds.

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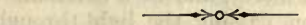
THE METHOD OF CHRIST.

AS TRACED IN

CHEMISTRY, PHYSICS, AND SPECTRUM ANALYSIS.



"He opened His mouth and taught them, saying, 'Blessed are the poor in Spirit, for theirs is the Kingdom of Heaven.'" Etc., etc.
MATTHEW v., 2-3.

By the natural eye men see what is natural; by the eye of faith that which is spiritual and eternal. By faith men see that God, the Allwise, the Almighty, caused the visible creation to be developed out of what has no natural appearance, and this simple statement is the highest expression of men's thoughts upon this subject. The vision of the call of Abraham, is still the heavenly vision to every child of God, and every one guided by the Spirit of God is found walking in the footsteps of the father of the faithful. Men are still sojourners as in a strange land; they desire to attain to what has been promised, and God is not ashamed of such pilgrims on life's highway. He is their God, and He will guide them to the city that is prepared for them.

Men will seek for God, the God of life and truth, and until they find Him there is no rest; and whether men know it or not, this is as true intellectually as it is spiritually. Is not this the great truth that underlies experience, science, philosophy and religion? All who think truly, seriously, are seekers after God, and they are seeking Him by the ways of faith, truth, life and love; faith is the atmosphere in which the soul lives; the way to God is by the light of Truth, and in that way there is found the true life, and self-sacrificing divine love.

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But men may say, How is it that in the past Christians have not seen this great light that radiates from the Beatitudes, and have not perceived this special relationship which they are said to bear toward the Bible as a whole, and toward its many divisions?

Here also the science of spectrum analysis and the laws of absorption and radiation may teach men, and throw light upon the mysteries of the Kingdom of God. In the days of Noah it is recorded that men looked upon the rainbow on the cloud and it became a divine sign of mercy, and of a covenant of God for all generations. Newton, passing the light through the prism, saw the continuous spectrum, but he did not see the dark Fraunhofer lines; and, it never occurred to him to suppose that, in a brief time in the world's history, light, the prism and the spectrum would be likely to become the means of revealing a universal unity and harmony of the physical universe.

It is the privilege of man to look out upon the universe in three ways; he is endowed with the natural eyesight and his range of vision is great; by the microscope he can peer downward into the world of the infinitely small; and, by means of the telescope he can extend his range throughout the universe and thus discover new suns and stars. As with the natural vision so with the intellectual, he may rest satisfied with the realm of experience, or he may by science analyse things invisible to the naked eye. By means of history he may bring near the distant past; and as from a Mount Pisgah he may view the great desert and look forward to the future with all its hopes.

It is Christ alone that gives special light to man in this realm of thought, and it is His Spirit that quickens man's spirit to see and know the real meaning that underlies all that has taken place in the world. The Christian age has been the spiritual age; that is to say, the Holy Spirit's period of special work among men. His visible symbols have been the two Witnesses, the Old and New Testaments of the Word of God; and if men would know in what way they have done despite to the Spirit of Grace let them ponder in their hearts what history has recorded of man's dealings with the sacred Word of God.

It can be conceived that in the providence of God, by the power of the Holy Spirit, such a new era has dawned upon this earth. It is not different in spirit from the Christ ideal; it is another cycle of the great work of God moving onward, breaking forth into light on every side, rising far above all the conceptions of men, and, in the most marvellous manner causing seekers after truth to become His servants to usher in the day of His

glory. The Spirit has been working in men with a new ideal; in the thought of the Psalmist He has been causing Truth to spring up out of the earth to prepare the way for the coming of Righteousness from heaven. Mercy and Truth have embraced each other, and the time must soon come when the Lord, the Righteous, will descend and reign over those who love truth and mercy. There are marked stages in this great work of the Spirit; it is not a question of haphazard discoveries and of the works of great genius; it is of a truth the Spirit's work in men making them lights to a dark world; and, what is still more wonderful, making those who were themselves walking in the darkness, rays of the light of divine truth, so that men may be brought to the knowledge of God's love, and the means by which He has carried forward through all the ages His great work of Redemption. A glance at the order of development in science will indicate this truth. 1. Bacon and the inductive method of philosophy. 2. Newton and his compeers in the field of astronomy. 3. The galaxy of chemists in many lands. 4. The workers in physics and natural philosophy. 5. The anatomists, physiologists and biologists. 6. Spencer and the fundamental conceptions of his philosophy. 7. Darwin and others in the realm of evolution in the organic world. 8. The great struggle of a generation around the problem of evolution. It has pleased the Spirit of God to move men to seek after the truth in this new way; yet strange to say the method is not new; it is another manifestation of God's manifold wisdom, and it follows in the order of the Blessings, the method of Christ, the means by which all His works have been carried out from the foundations of the world. Even as the Lord Christ was pleased to call His disciples, and Saul of Tarsus, and they followed Him, so it may be said of all seekers after truth, the Lord of Truth called them, gave them a work to do, and the needed grace for service; therefore let all His servants praise Him and be ready to acknowledge His authority.

It is important to notice that one result of this great development of science has been the conception that there is in all the diversities of operations a great unity in creation. This conception strengthens with the years, and although there are many diversities of thought, men are being led to perceive that the end can only be a monistic philosophy. There are two parties and two conceptions as to that which is the cause of all manifestations in nature and man; and, it is evident that this is the point where men must meet and where the battle must be fought to the finish. The ultimate of one party is the natural,

Force, and an unknowable power, the cause of all the diversities of operations that are known to men; the other party has faith in the supernatural, in the Almighty, Allwise God, the First Cause and to them it is simply inconceivable that an unknown power, in the awful darkness, could by chance, natural selection, or by any mechanical means, apart from God, manifest creation, the works of providence and the work of redemption. When the two parties thus stand face to face it is useless for them to reason together upon this final problem. This is not a question of relations to be solved by the intellect; it is faith or unbelief; the natural or the supernatural; it is God, light, life, love, and heaven; or the devil, darkness, death, hatred and hell. This is the root problem which has persisted for ages, but the day for the final decision draws nigh. Men may not see that this is so, but they are actually in the heart of the struggle and they are powerless to prevent the issue.

It may seem strange to state that the "unknowable" is the positive cause of all related knowledge as gained by the intellect, and that all knowledge attained by reasoning, is negative: in other words, as the essence, being, or substance, of the unknowable cannot be known by man, as final cause, so effects are only the relations of that cause, and thus the reality in them remains unknown. This seems to be the fundamental conception of Mr. Spencer in his philosophy, and it is the acknowledged position of agnostic thinkers. In opposition to this conception, arising out of the darkness of mere intellectualism, those who have faith in God, as First Cause, bow before Him as the Absolute Reality, the Positive power in the Universe, and they frankly confess that they are, in all their powers, negative as derived from God, the heavenly Father. In this far-reaching meaning of positive and negative it is admitted that there is a point of limitation where men may assert themselves as positive, but it is here that men go wrong, because what they consider to be positive, as seen in their own self-asserting sinful ways, is really perverting to evil uses that which is good, and from God.

In the development of this order of thought from the standpoint of science there has arisen the conception that the true trend of science is toward limitation as to intellectual problems, and to unities in what is conceived as ultimates, the philosophic thoughts that lie behind and beyond all scientific relations. In nature and man these are reduced to the following ultimate symbols: Force, as the root concept of all that is inorganic in the universe; Life, as the cause of all that has been manifested in the organic world; Spirit, as the power in man that sees,

knows and wills; Mind, or Memory, as the subjective psychic realm in man within which all images, ideas, and thoughts subsist; Intellect, the power by which man correlates all thoughts, and places them in empirical or scientific order in the realm of truth; the Moral nature is linked with the intellect in such a way that it perceives truth as correlated with righteousness or the moral life. These constitute manhood; and had man lived in harmony with the Divine laws, written in his own being, and in nature, he would have developed into a perfect man in the image of God, knowing the truth and doing what is right. There came that mysterious Fall as revealed in the symbols in the Book of Genesis; and thus God, the gracious, manifested Grace so that fallen man might return to the Father. But in the mystery of man's redemption sin and evil are in constant conflict with the gracious purpose of God, and so with Grace there is added an eighth principle which is embodied in such words as sacrifice and suffering. It is enough to add that Christ is the perfect, true righteous Man; and, that as Grace and Sacrifice for sin, He is the Son of God. It may be well to add here that such abstract principles, as ultimates, do not convey any theory as to what they are in themselves; they are like the visible colours on the spectrum that is derived from light; they are ultimate concepts; symbol names for manifested facts; and they require to be re-refracted back again through Christ, the true Spectrum of the Divine, and then they converge in Him in Light; and beyond Christ is God, the Eternal Reality.

If these principles, into which nature and man converge, are laid side by side with the Beatitudes uttered by Christ, and the student will, as by a spiritual spectrum analysis, compare the two sets of thoughts in the light of heaven and spiritual truth, it will be seen that they synchronise with each other; and they respond and correspond.

Some scientific, philosophic, learned men have perceived that the whole of nature is set to the divine music of vibrations and of octaves of vibrations, that are in perpetual operation. They have also conceived that man is set in his own place in harmony with the universe, and that they are mutually responsive to each other. There are those who utter discordant notes in the face of heaven; they seem to say that somehow, by chance, by some kind of affinity, in ways that cannot be defined, the things that exist have arranged the music that they perform; and, what is so wonderful, is to be praised along with man who has discovered what the music is saying to him. If it is a possible thing for men to conceive such visions of truth, and then say that

God is "the unknowable," for this has been done; then it is plain that in some mysterious way they have become diamagnetic to what is heavenly and spiritual; and their souls have been so changed that the light is to them as darkness. Let it be assumed that the Bible is found to vibrate to the same mystical music that exists throughout the universe, with this difference, that it is higher in its order—Divine, would this be sufficient proof to agnostics that God lives, and that it is by nature, man and the Bible He speaks to men? They rule all such evidence out of court; and this infatuation of only believing in what they call the natural seems incomprehensible folly. They are compelled to confess that they believe in, and cannot deny the existence of, "the unknowable;" and yet they are determined not to see that "the unknowable," and God, the Reality, is the power, the cause producing all effects.

It is within the range of possibility that to many men such thoughts as these, even though they coincide with their own natural beliefs, are mere visionary, metaphysical speculations which tend to no practical purpose in life. But what if the dream be true and the vision heavenly? What if the light of truth can only come to men in this strange way? Are men so very wise, so omniscient, so perfect, that they can afford to turn their backs upon what may bring to them the light from heaven? Is the realm of darkness, strife and death, so very pleasant to live in that men should desire to know more of its mysteries. If Christ graciously offers to men the key that will unlock the doors of light, life, and love, may they not with fear and trembling anxiously enquire, Will this key find responsive thoughts in the dark realm of energy and matter?

It is necessary to pause and offer an apology to many of the sons of Science for the apparent want of consideration given to them in this search after truth. It has almost come to be a commonplace among men that science and agnosticism mean the same thing; whilst the truth in this matter seems to be that there have been as many eminent men of science believers in God as there have been agnostics, who could only find rest in the darkness that surrounds "the unknowable." One son of science expresses his conviction in these words, "The laws of nature are the thoughts of God"; and it cannot be questioned that this thought is being repeated in manifold forms by those who seek after truth in the fear of God. It is important to notice what follows from such a conception as this, that the thoughts of God are the laws of nature; it means that God is first, that He has left His footprints in the universe; and men

are following hard after Him that they may know the order of His thoughts. The agnostic wanders in the darkness; he cannot find any God, he can only find machinery, and the result is the idolatry and worship of Nature.

The divine order is from the Spirit, and the spiritual, to the physical and the forms of things; and man begins to read through physical and material forms the thoughts of God. The Almighty, Allwise God, develops, makes manifest in the universe all that has been manifested; and His children, in their fallen, lowly state, seek Him spiritually, by the spirit within them, by an objective world through the special senses, by images, ideas, correlated thoughts, reasoned relations of truth, law, righteousness, grace, and by the experiences of suffering and sorrow. This way of life is not an easy way; it is a strait difficult path to tread, but there is no other way that will lead men to God, life, and immortality.

The way is there, it is absurd to find fault with it, the stages are marked, and they may be summed up in the three realms of Experience, of Science, and of Divine Wisdom. The fair realm of science can only be reached by the well-trodden pathway of common, human experiences; and only through science, the ordered thoughts of God, can men consciously ascend to the third heaven where the Divine Wisdom reveals to men the unity and harmony of the universal thoughts of God. Even in the material world the Spirit of Truth whispers in the ears of those who hear, the same far-reaching truths; because, as men know, there is that which is earthly, solid; there is that which is ocean and river, water; and, there is the atmosphere of air in which men live, move, and have their being. There is that which is potential, and that which is dynamic, yet these states are fusible into one when seen in the light of Divine Wisdom.

It is necessary that this conception as to three realms of truth, linked together and yet separable in their order, should be clearly understood, they exist, they are stages in the process of development, they have their own unities and harmonies, and the unity and harmony of all three in Divine Wisdom points to the reconciliation of all things. The fullest experience by the senses and faith in God, is the highest empiricism; and all that is conceivable as wisdom within this range of the vision of man, apart from pure science, belongs to this realm of thought. Men may not favour this conception of relegating their knowledge, their great attainments, into a kind of childhood, the state of minority; but, it is difficult to see how this is to be avoided in the light of science and what true science represents. Futher, it is to be

remembered that the birth of science brings with it manhood, that is the power to pass beyond what is empirical, the results of experience, and there is conscious awakening to the spiritual realm of law and order, of true relations conceived from intellectual concepts. This is fully explained by the science of astronomy; geocentrism is dead, the sun reigns in the solar system, and the law of gravitation is universal. It must be the same with all the other sciences, the earthly and the individual must give place to the universal; and thus the very order of the thoughts of men are revolutionised. It is science that intellectually spiritualises men, they rise from this feast of divine truth new men, wondering what these visions of science mean, and in what direction they point. The God-fearing men of science declaring that they point heavenward; and, those who have only natural mechanical souls, concluding that all is earthly and sensual. To the spiritually minded, moved by faith in God and Christ, the universe is spiritual, to the carnally minded there is no divine illumination, they have extended the world of experience but they have not out grown their physical senses or the visions of empiricism. With experience man treasures up within his soul a diversified world and faith is as the candle of the Lord lighting up the darkness; when science dawns upon the soul then the light of heaven is come, and the onward course should be as the rising sun and the perfect day. But, as yet men do not see this consummation toward which they are moving; science has not scaled the bulwarks of the city of God and looked down upon the Palace of the King in all its glory. This position has been gained; science has pointed the finger forward to principles, related ultimates, and ultimates; and, the Divine Wisdom sends forth the invitation to prepare, and be ready to enter in and enjoy that great feast provided for the sons of men.

The gracious invitation is to a divine feast; or, it may be, a summons to the divine judgment seat. The visible, sensuous world is as a thick veil through which men cannot look and see God. This veil is being rent from top to bottom; the spiritual is flashing through the carnal, and before men will be able to comprehend what these things mean they will find themselves in the light of heaven, and the Divine Sun of Truth shining in their midst. In His presence all will wish to veil their faces; the boasters will be humbled to the dust; self-assertors will be ashamed; there will not be any self-glorying then, for it will be seen that all were lost in the same maze, all had passed through the same terrible wilderness, and Christ alone has been Saviour, Shepherd, and Guide, to lead men onward to the land of promise and the city of God.

Here it is necessary to pause for a moment and glance backward into the past and try to conceive some of the difficulties of those men who have earnestly sought to solve the mysteries by which they were surrounded in this world. If the long line of philosophic thinkers is traced it will be seen that there has been order in development; that the great thinkers have had many visions of truth; and, that there has been amidst all diversities a tendency to unity, and a strong desire that the vision of unity they sought after should be found. Babylon, Egypt, Palestine, Persia, Greece, Rome, Europe, and Asia, have all had their philosophers and wise men, but all have failed to find that unity and harmony which would be acceptable to all men. The reason may now be discerned they sought to harmonise experience and wisdom, and they knew not that this end could not be attained by these two powers. There are many rays of truth in experience; there are flashes of divine wisdom in the philosophies; there are heavenly visions of light in religion, but science with its power of spiritual analysis was absolutely required; and not till science came did men really emerge from the realm of empiricism and begin to see clearly that truth must be universal.

It is not necessary to enter into many details upon this point and to show in what way the Babylonians sought after wisdom by studying the heavens; their strange signs have been carried down through the centuries, and thus modern astronomers by the names they give stars and constellations of stars, are found walking in the footsteps of the Chaldeans. From Phoenicia came letters; from Palestine religious forms and practical wisdom; from Persia great concepts of light and darkness, truth and righteousness; from Greece the great intellectual speculations of philosophy; and from Rome the laws of the home and the state, of moral government. The ultimate analysis of nature, as found in Greek philosophy, into fire, air, water and earth is very suggestive. The Buddhist conceptions of Pantheism and manifold cycles of development and change are the foreshadowings of great truths. The persistent efforts of the Alchemists to find the stone that would transmute the base things into pure gold; the water that would endow man with perennial youth; and the one pure matter; all these may seem foolish and visionary in the light of science, but these men were assured that such things could be found, and in their own way they sought what they thought was highest and best. Alchemy foreshadowed chemistry; but, in alchemy men sought knowledge by superstitious, magical signs, and ceremonies, and thus the

results were unsatisfactory. There was no lack of practical knowledge in the past ages; within this realm, it is doubtful if men are wiser at the beginning of the twentieth century A. D.

The position therefore may be summed up in this form, so far as experience and empiricism are concerned; the ancients, in a general way, concluded that atoms, fire, air, water and earth were the elements into which nature could be resolved. It is true that they knew about copper, gold, iron, lead, tin, zinc, sulphur, and it may be other forms of matter, but this knowledge was different in kind from that of modern chemistry. The children of experience now are in the same position; the sun in the heavens is the great fire which gives light and heat; the air is that element in which they live; the water is the representative fluid element, and all else is matter or earth.

THE SCIENCE OF CHEMISTRY.

The science of chemistry is something altogether different; it is connected with the region of the senses, but it soars into a higher region by the power of abstract thoughts, signs and symbols, and by chemical analysis it tears to pieces all forms of matter and resolves them into their ultimate related elemental forms. The results of this analysis of matter, as explained by chemists, is that they have resolved all that is tangible, or gaseous, into about 70 elements; to these they give distinctive names and by these there is separation and definition. The elements are found in the three forms, of gas, liquid and solid; there being 7 different gases, 2 liquids, and say 61 metals and metalloids.

The means by which chemists have discovered elements is an interesting study, and such information can be obtained in books dealing with this subject. The object in view at this time is not to enter into details as to this science but simply to accept the facts which chemists make known; from these try to discern whether the method of Christ can be applied to this realm; and if, when applied, it will throw any further light upon the problems which are so full of interest to men of science. A philosophic chemist, looking at this problem, from the stand-point of philosophy, expresses his thought of the science of chemistry in this way: it is the study of the ever-changing forms of the unchangeable. The conception being that behind all the changing forms of elements and compounds, there is a Reality that never changes. This conception of the science of chemistry lies at the root of all the sciences; science, by the intellect of man, can only

deal with related thoughts in their order of development, and behind all changing related symbols there exists Reality.

It ought to be remembered that such conceptions are not scientific; and the chemist referred to would not suggest for a moment that the science of chemistry has reached, or will ever reach, such a conclusion. The scientific order deals with the related facts, and these are that chemical analysis reduces all forms of matter to about seventy elements; these elements are distinguishable as being different from each other; and, so far, chemists have not been able to make any further divisions. That is to say, they do not assert that each of these elements is one and indivisible, but so far they have not been able to carry their divisions any further. Matter in its diversified forms is related and correlated in thousands of ways, but the chemist, by limitations, separates, isolates, and thus by persistent analysis breaks to pieces all that can be measured or weighed, and the results are the elements of matter.

One element of matter is to be conceived as a homogeneous thing; it is one thing, and chemists are not able to make it into two things. Every other element is something different, and here the chemist finds his limitations in the analysis of matter. Apart therefore from all philosophic conceptions, the chemist, if a true son of science, will not swerve from this position which is at the present time the limitations of the science he studies; matter can be resolved into these elements which differ from each other quantitatively and qualitatively, but what these elements are, in the ultimate reality, the chemist has not discovered, and it is now the generally accepted view that this discovery will never be made by science. It may be useful to note here the importance of this unit conception; it is the end to which every science tends; and it is that point at which science is compelled to stop. It may seem very abstract to state that the intellect cannot compare a unit, but this is the simple truth. This conception may be put in a more realistic form in this way: every process of intellectual reasoning is taken from opposite sides, or from many sides, but the intellectual road to truth converges, becoming more and more narrow at every stage of advancement, and, at last, the one blocks the way of further reasoning; the intellect is confounded, struck dumb, limited by the Hand that no man can move. It is not suggested here that chemists are confronted with seventy units which cannot be compared in their relations toward each other; these are the related units; in itself a unit cannot be divided, but at the same time a related unit among other units can be relatively studied. In this sense, it will

be observed that another avenue of enquiry opens to view in the manifold problems of how these units are correlated to each other, thus beginning another series of intellectual reasonings which may bring the enquirer to the very footstool of the Divine Majesty.

So far therefore as the science of chemistry is concerned in the analysis of matter, chemists have reached definite results, and these may be studied in their scientific order in the table which enumerates the names of elements, their symbols, atomic weights, specific heats, &c.

With reference to the names of elements, the expression of opinion may not be out of place, that they are not to be taken as scientific; they are not so scientific as names generally, or even of common speech; in other words names and facts are not truly correlated. There are a few of the names of elements where names and qualities seem to agree, such as hydrogen, the water producer, oxygen, acid, the light and life giving power, but others are commemorative of places, or persons, and thus they have no real value, as names, which would describe and coincide with chemical qualities.

With the column of symbols used it is different; although it is true that the letters are, as a rule, abreviations of the popular names, they become true scientific symbols, abstract concepts, of the highest value and usefulness. It may be that in no other science can this perfection of symbolism be better illustrated than in chemistry. The symbols give the ultimates of analysis; and, with synthesis, in chemical combinations, very elaborate details are summed up, by adding to each symbol those numbers of proportions in which elements will combine to form a compound.

In the column where the atomic weights of the elements, as related to hydrogen are given, the standard set up is H. 1 as that by which all other elements are weighed, or measured by volume.

In the column where the specific heat of elements is given, the information conveyed is that all elements receive heat and retain it as latent. It is found that the average product of specific heat over all the elements is about 6·4. Because such an average is found to exist it is assumed that this tends to confirm the atomic theory in its relations as to the weights of elements.

There is a table for the specific gravity of elements, taking water as the standard, as 1; these would generally agree with the atomic weights; only when the bodies are of a porous nature, then it must follow that the mass of the element will be proportionately lighter than the atomic weights.

The fusing points of temperature at which the metals are melted are also tabulated.

The temperatures and pressures required to change gases into liquids and liquids into solids are also known and tabulated; and, it is stated that chemists have also set in order the rate of vibrations of elements in radiant light, the angle of refraction at which they pass through the prism, and the colours they absorb or radiate as identified upon the spectrum. These, however, as having specially to do with light and spectrum analysis, do not seem to be a part of the science of chemistry.

It will be perceived that such a table of the elements, their names and relations, when seen by the initiated, those who understand all the symbols, and what they represent, gives a fairly complete analysis of matter as it is found in gases, liquids and solids. The names and symbols express differences, and separation. The atomic weights express quantitative relations in the elements as related to weight or mass, and also as to volume with hydrogen as the standard of measurement. It is not to be assumed that the atomic theory is finally accepted by chemists as the only rule by which the relations of elements are to be decided; neither is it to be set down as conclusive that the real atomic weights of elements are exactly those that are given. All that can be said for such a table is that it fairly represents the results attained by chemists in their experiments and enquiries; and where such agreement exists, it may be taken for granted that the facts are fairly represented.

To the uninitiated the names used by chemists require explanation; and, perhaps, such terms as "atoms" and "molecules" are those which men generally are least able to apprehend. The atom is conceived as the ultimate particle of any element; it is what cannot be cut or divided, thus the atom of an element is the one ultimate particle of the one elemental substance. It is not to be supposed that any one has ever seen an ultimate atom: it may even be conceived that 10,000 atoms would require to be united together before the object would be brought within the range of sight and touch. The atom therefore is a something never seen, it is believed in, and so related by the intellect that it becomes a standard of measurement or of weight. Chemists accept this theory of atoms as the best workable hypothesis of dealing with matter; yet they say they have never seen the atoms; and they conceive it to be within the range of possibility that a more perfect theory may be devised in the future which would give a fuller interpretation of all the facts of their science. A molecule differs from an atom in this way:

it is two or more atoms joined together of the same element; or, atoms of different elements united together in those proportions in which they are found to combine by chemical synthesis.

With this explanation as to atoms and molecules, it is not difficult to follow what is meant by atomic weights and volumes; thus Hydrogen is the standard as 1, Lithium 7, Carbon 12, Nitrogen 14, Oxygen 16. These figures mean that 1 hydrogen and 7 lithium; or 1 hydrogen and 16 oxygen, are equivalents.

The law of Avogadro, which explains this matter is as follows: "Equal volumes of all substances, when in the state of gas, and under like conditions, contain the same number of molecules." These words mean much; they assert a universal truth, and it is very marvellous that in so few words such far-reaching conceptions can be concentrated and expressed. The law may be conceived thus: every substance, in the same state—gas—under the same conditions of temperature and pressure, contain the same number of molecules; and this same volume, being measured by a standard of volume, the equivalents are as expressed by the atomic weights set against each element. It can be seen at a glance that the application of this law is not simple, because it would be very difficult to reduce metals to the same condition as hydrogen, a pure gas; but this is done by means of other gases, and by the multiple proportions in which elements are found to unit chemically. The conditions imply temperature and pressure, because, as these vary so volume would be altered.

Here it is necessary to explain that temperature and heat are not to be conceived as identical terms. Temperature is used to express the condition of a room, or the state of the atmosphere, and in this sense it is generally understood. Heat on the other hand is a technical term, expressing motion, which produces increase of volume. Thus if heat is applied to water the bulk of the water is increased; if it is applied to a thermometer the mercury rises in the tube by increase of volume, or if it permeates a rail of iron the rail will expand in length. The temperature of the iron rail would be nearly the same as that of the atmosphere, but the heat received into the iron would cause the iron to expand. Heat, therefore, is a power that can be measured, and it may have a definite standard. The standard given is that amount of heat, as energy or motion, which will raise the temperature of one pound of water one degree. As already suggested the specific heat of a substance is its capacity for receiving heat; and the product, or the average of all the elements, is 6·4.

It is thus conceived that by the application of heat, or by reducing pressure, the proportions of volume may be changed; and, what is known as the law of Boyle, expresses this change of relations. "The volume of a confined mass of gas is inversely proportional to the pressure to which it is exposed; the smaller the pressure the larger the volume, and the greater the pressure the less the volume." The law of Charles may be expressed thus: "The volume of a given mass of gas, under a constant pressure, varies directly as the absolute temperature." The pressure of a gas is due to its molecular energy. Increase of energy increases, in proportion, the pressure; or, if gas is free to expand, there will be increase in the volume. The reasoning is that by the increase of energy there will be increased temperature. Therefore it is to be inferred that heat is molecular energy.

This question of temperature and heat is not a simple one, it is to be met with in chemistry, in physics, and in spectrum analysis, and thus it requires special consideration in view of the many complex problems in which it is involved. Temperature is measured by the thermometer—the heat measurer—by degrees marked upon its face, but these marks are relative, only two of them being known fixed points. These points on the centigrade thermometer are at the freezing point of water marked 0° and at the boiling point of water 100°. In an arbitrary fashion, the space betwixt 0° and 100° is divided in equal degrees. Taking this as a standard of measurement, the tube may be lengthened upward and downward in equal parts and marked in equal degrees above and below 0°. In theory this prolongation of the thermometer may be carried to 273 above 0°, and to 273° below that point; and, the latter, it is suggested is an absolute scale, not of mere theoretic value, but because at this minus absolute temperature it is conceived that molecules of gas would be at rest. It is known that at very low temperatures, under pressure, the lightest gas, hydrogen, may be liquefied, or even changed into solid matter, and thus this theoretical 273° below zero is one of interest to chemists and physicists. By the very fact that at extremely low temperatures gases are liquefied and turned into solids, it is evident that the interest is not one of mere theory; it touches relations of matter which may be found to be of importance.

Passing from this point of temperature—heat and cold—the thought can be kept in view that heat is a kind of motion, molecular energy in operation, and thus it may be changed in form and become the means of producing chemical changes in

matter. Those changes which are chemical in their nature are conceived by chemists as "reactions." There are differences in the equivalence of elements, and thus when they are brought into contact there are produced chemical changes; and the products of the reactions are different from the elements bringing about the changes. Heat is produced by chemical reactions; in other words, there is a kind of ignition, a fusing of the elements, and the results are changes that could only be known by chemical experiments. As examples of what is meant, when the two gases, hydrogen and oxygen, combine chemically, the result is water, and the symbols for this reaction are H_2O. In other words, two parts of hydrogen and one of oxygen under certain conditions are fused into a compound, a liquid known as water. Again, phosphorus and oxygen unite as P_2O_5, and the product is phosphoric oxide, and in this change, or reaction, there may be evolved light and heat during the process of change. When nitrogen 8-10ths and oxygen 2-10ths are mixed the result is the air that is breathed; but this is not a chemical reaction, it is a mixture of a mechanical kind, as when sugar and sand are mixed together.

From this very brief explanation of elements, atoms, molecules, temperature, heat, chemical reactions, and mechanical mixtures, it becomes evident that the study of chemistry is very complex; that the uninitiated can only follow certain lines which masters of the science lay down; and, it is not to be expected that the details of the science can be dealt with in a study of this kind. If the principles can be grasped, the highways of thought discerned, this may be enough for guidance through the mazes and intricacies of the science. Thus far the trend of thought is in this direction: every form of matter can be analysed into elements; elements are related ultimates; 70 of these ultimates lie at the root of the science of chemistry; and these elements are the foundation stones of the visible and invisible universe. The elements can be reduced, in theory, to ultimate atoms, and it is found necessary to clothe them with the powers of attraction and repulsion. In fact, as some chemists avow, these conceptions have more of spirit than matter in them, and at the root they are spiritual, not physical. Whether men will have it or not they are forced into touch with the divine; and, the question then prompted is this, Is the thinker spiritual or natural in his own soul? Is it not true that even down in this low realm of thought, enshrouded in matter, encircled by the darkness, there is that marvellous duality which extends throughout all realms of the universe? On the one side there stand up the 70 elements

in all their silent grandeur as voices of God from the unseen; and on the other there is heat, that subtle power with its thousands of definite molecular vibrations, ready to enter into contact and chemical unity with these elements. In the darkness these powers face each other; and, what is very wonderful, the elements, with their atoms, are attuned to perfect harmony with the devouring heat from beneath, or with the gentle light from heaven.

These thoughts require to be carried forward into the realm of chemical synthesis; they lie at the root of the science of chemistry; and it is to be feared that the chemist who blunders at this point is only a journeyman mechanic, who has not studied his science as it ought to be studied. The higher souls, touched by the true spirit of science, realised this truth; they knew that they had been privileged to enter the house of God; the vibrations of the elemental stones had kindled in their souls similar vibrations, and thus they felt as did the patriarch awakening from his vision, when he said "This is the house of God, and this is the gate of heaven." It is strange, but true, that even in this realm of enquiry, agnostics have felt that it was not dead matter they were dealing with; the things they handled were living thoughts, spiritual conceptions, something that transcended the natural. Again and again from the lips of agnostic thinkers the confessions have been poured out that they were unable to believe that what they perceived by the intellect was only dull, dead matter. Is it a flight of the imagination, or is it sober truth that chemical synthesis is the spiritual appreciation of the thoughts of God; man spiritually awakened to read the thoughts of God as they have been revealed in a language of symbols? Is it to be supposed that the chemist discovers ways and means of chemical combinations which never had any real or ideal existence? Is it by his wisdom, or by the power of his right hand, that he gains so many victories over matter and energy, making them his servants to obey his will? Not so; all chemists confess that in such matters they are mere children, that the things with which they deal exist, have weight, are moved, have relations of quantity and quality, and that it is only by realising such thoughts that they are able to proceed with their science intelligently. Chemists do not limit, or prescribe to, nature; but, as they confess, nature prescribes how they shall think and act; they are not creating out of chaos a cosmos; they are being led to understand that in the midst of an apparent chaos law reigns; and that, by law, the thoughts of God, the chaos can be spiritually set in order as a cosmos. In other words, chemists

definitely state that, in dealing with chemical reactions and combinations, they have to remember laws of equivalents, atomic weights, proportions and definite quantities. It is not an easy science, for it deals with laws of simple and multiple proportions; laws of combining weights; and of fixity of compositions, affinities and reciprocal tendencies which take their own way in forming chemical compounds. When all these things are understood then the mystical symbolic language of chemistry is seen to be of great value; it becomes the spiritual expression of the visible and invisible relations of that house of God which is local, earthly, or universal.

In thus thinking upon the analysis of matter to elements, and the synthesis from atoms and molecules to compounds in thousands of forms, as explained by chemistry, it is necessary to remember that the order followed here is not that of practical work but the method best suited to convey knowledge of the truths that underlie and permeate this science. In the laboratory the order is different; there practical work is undertaken and thus the processes of chemical reactions, of analysis and synthesis, are carried on side by side. Chemists speak of a process of chemical study which in its nature seems to rise above analysis and synthesis; it is named metathesis to distinguish it from the other two orders of thought. The meaning of analysis being to tear apart; of synthesis, to bind together; and, of metathesis, to interchange. When the way of analysis is followed the result is 70 elements; when the way of synthesis is followed then matter is bound together in chemical combinations in thousands of forms; when the way of metathesis is followed then man is seen trying his journeyman's knowledge and experience, in making up new chemical combinations, in substituting another element to take the place of one already built up in, or recognized as a part of, some complex chemical substance. It is not to be supposed that the chemist conceives a new chemical compound; but, rather, given a definite compound with its structure known, then how can he retain the same structure and yet put into it other elements which have similar qualitative properties? It is observable in works of chemistry that the conception of building up structures is ever the leading idea; the chemists work is that of a master builder. The plans, specifications, details are all there, and any thought of departing from these would seem out of place. When the skilled workman, as architect, attempts the work of metathesis, it is not his purpose to destroy what has been built up; he wishes to try changes and varieties in the structure, knowing that in many instances the

risk is great, and that he may even cause the whole structure to fall to pieces. This kind of work cannot be done by "rule of thumb" men; the master takes his place in the arena, and it is as master, not as servant, that he seeks by the laws he understands to produce new chemical compounds under altered forms and conditions.

Metathesis, it will be seen, introduces a new factor into the science of chemistry; and it is a very important factor because it is nothing less than man, as a spiritual intellectual being, as a co-partner, entering into sympathetic co-operation with the Divine will as revealed by law. For this end man lives, and until he fulfils this purpose in the Divine administration he will remain a mere child of experience who does not understand his Master's thoughts. It must surely have been by some such process of thought that the Russian chemist Mendeleeff was led onward to the discovery of what is known as the "Periodic Law of the Chemical Elements." This discovery generally supports the atomic theory as to quantitative weights, but it is a great advance in another direction because it tends to throw light upon qualitative properties.

The lines in eight divisions contain the elements in the order of their atomic weights, advancing stage after stage until the twelve lines sum up the elements that are known and unknown. In this list, following this order, there may seem to be large drafts made upon the imagination and upon an uncertain future. This is true, the plan is one containing much practical knowledge; it has within it, faith; and it is said that recently one of the supposed elements has been discovered.

When the table is studied by the perpendicular lines, the order of thought is changed; the relations are those of properties, or functions, of likenesses, or family resemblances. This double order is complex; and only practical chemists could be supposed to apprehend what these things mean. It would seem, however, that chemists generally agree that this table fairly represents great truths in the realm of chemistry. One chemist may see in these periodic developments only the bare facts of chemical elements in their correlations; another will also see elements, but in these, and radiating from them with glowing glory he will perceive the thoughts of God. If the first line is taken, it is seen that hydrogen stands alone; it is the unit, and it is the element by which all other elements are measured as related to their atomic weights. The second line contains lithium 7, glucinium, or berylium 9, boron 11, carbon 12, nitrogen 14, oxygen 16, and fluorine 19. The three first elements in this

line are not so well known as carbon, nitrogen and oxygen; and fluorine seems to possess special qualities which tend to separate it from the three elements that precede it. The aspect of this question from the mystic standpoint is difficult to express; this is the very lowest form in which the method of Christ can be foreshadowed; and yet, at the same time it is here that the earthly form is found, that the symbol takes shape from which image and idea are derived, and upon which language and spiritual concepts are built. It is well known that images in the mind, ideas, concepts, spiritual representations, are all developed out of the relations of the external world with the special senses, and it is not so very difficult to follow this order of thought. Here man considers strange symbols and tries to discover in what sense, and in what way, such symbols are attuned to the Beatitudes, or to those principles which are the foundation stones of nature and of his own being.

The thought is traceable that in the first line there is onward development; that in the unity of this period there is diversity, and that in this diversity there is analogy to that which is spiritual. The analogies in the three first elements are not easily traced, they may have mystic meaning, but with 4, 5 and 6 it is not so very difficult to trace analogy. Carbon is a well-known element; it is found in the precious diamond, as a gem of perfect crystallized beauty; it is found in coal, coke, and lampblack; and it is in the beautiful white lump sugar that gives sweetness to the food of man. Carbon is the great symbol for what is of the earth; and it may be used to indicate, as by electric light, in what way that which is earthly may by the light of truth and righteousness rise to what is heavenly. Carbon enters into thousands of chemical compounds in the inorganic and organic worlds, and chemists seem to hint that the carbon element transcends all others in its power of chemically uniting with other bodies. Carbon is a solid body; it is central and stable; it unites freely with the gases, and thus, as an element, it is a suitable symbol for the earth and matter. Nitrogen, the fifth element, unites as a gas with many elements; it exists in the air, mixed with oxygen, in the proportion of 4 to 1; it is found in nitro-glycerine and gunpowder, with their terrible explosive forces, and it joins with oxygen to form nitrous-oxide, or laughing gas, by which men when they inhale it become unconscious and act as automatons. That nitrogen may fairly be taken to represent in symbol the intellectual power of man is not difficult to conceive; the intellect bulks largely in man's atmosphere of thought; it is a terrible dynamic power to let loose among men;

and, when inhaled too freely, then the conscious intellectual balance is lost, and the god-like man becomes a plaything in the hands of more skilful well-balanced minds. With oxygen the analogy with the moral nature of man is more easily traced; it is the light-giver and the life-nourisher of all that is organised; in other words, whilst truth may be discovered by the intellect, it is not the true light radiator; it is the moral nature that absorbs and radiates truth, and only by the pure moral life can man live in the light of law and see the face or hear the words of God. The importance of oxygen in nature may be understood from the fact that it is supposed to represent one-half of the earth's substance. Lavoisier, the French chemist, supposed it to be the chemical centre in the scheme of nature, and made the oxygen compounds the basis of a new classification. Fluorine, the seventh in the first line, is more limited in its chemical reactions; yet as the seventh it may be found to strike its own heavenly note, as the foreshadowing of that great Fluorescence of the Divine, the true Light to this world in its fallen state, by whom men find life, peace and salvation.

It should be remembered here that the object in view in this study is not to learn or teach chemistry, it is to find, if possible, whether the method of Christ can be traced in the physical sciences, and if it is found, then will such a study influence, or throw light upon, what is spiritual? This subject of chemical elements, their quantities and qualities, is far too intricate for those who are not experts, therefore it must be left to those who are competent to deal with this matter. The special point reached is that the periodic law of Mendeleeff bears on its face an analogy to the method of Christ; and that the first line of elements have their analogies with Nature, man and the Beatitudes. It will be observed that the periodic law extends to an eighth column; but the eighth is not always represented. Further, it is to be assumed that the law as expressed by Mendeleeff is not to be taken as full or final, neither must it be taken for granted that the elements in their varied columns are in the position they will finally occupy when this subject has been more fully studied by chemical experts.

It may be well to point out here that there is another side to this study; the light that must shine into this dark realm of nature, to reveal the harmonies that exist, must come from the Word and Spirit of God. The spiritual light shines in the Bible, and what men may expect is that the light from heaven will set this light on the earth into quivering sympathetic vibrations when the true relations are known. If, therefore, the periodic law of

chemistry synchronises with the periodic law in the kingdom of God, then this will be discovered by following the analogies which exist betwixt the two realms. This ought to be remembered, that each horizontal line is, so to speak, a periodic unity in its diversity and complexity; the second line is another beginning, as it were, an octave higher, ever increasing in greater diversity and complexity; the third line still more complex; and the fourth line will be expected to synchronise with the fourth element, carbon, thus reaching the stage of development which finds its harmonies in the realm of experience and empiricism. In this way the spiritual descends to the physical; the physical is transfigured, and is seen to be the spiritual thoughts of God.

It is not advisable at this stage to enter more elaborately into the lines of thought which seem to open new ranges of the thoughts of God in chemistry as related to this periodic law. There is, however, a plan written out by Meyer, the German chemist, worthy of careful study; it carries this subject still further onward into those complex relations of matter which have their roots in the science of chemistry. The plan referred to is built upon the periodic law of Mendeleeff, with which he is in agreement; but he goes on to represent upon this plan, in each period, the properties of the elements; their ductility or brittleness, their density and volume, and the electro-magnetic positive and negative portions of the cycle or period. In the plan referred to, the fourth division suggests many thoughts which require study; it becomes a double division, extending high in the plan at the two ends, and holding within its ample capacity a two-fold division of qualities of metals, and of positive and negative states of electricity and magnetism.

It may be that such problems as the relations of heat and electro-magnetism require to be studied as they are related to chemical action; but, the impression gained in the study of chemical books is that chemists are not yet able clearly to define their conceptions of such matters. It would seem to be an open question whether such matters come fairly within the range of chemical science; they deal with energy, and thus it is probable that they fall more directly into the realm of physics. The realm of chemistry is matter in all its states and reactions; it deals with what has weight and volume, and thus when the attempt is made to annex physics as a portion of the realm of chemistry it is felt that there is a want of fitness in thus trying to reach the end desired. The suggestion that chemical affinity is a phase of electro-magnetism may be true; but the idea will arise as to the validity of such a conception seeing that chemical changes are

supposed to be molecular in their nature, whilst electricity and magnetism are thought to be modes of motion in connection with the ether.

On the other hand, it is difficult to see in what way the realm of chemistry is to be limited to elements and their reactions; if heat and electrolysis are the means used for the decomposition of matter, then it would appear to be unreasonable that chemists should not study those forces which bring about changes in chemical reactions. It may fairly be assumed that no distinct cleavage exists in the physical sciences; they are mutually correlated; they lead onward and upward from chemistry and physics to spectrum analysis, and, in the results of the three sciences, unity and harmony may be found. This truth can be more easily seen in the physical sciences of life; any dislocation of these sciences would be fatal to that unity and diversity so ably worked out by Charles Darwin, and others.

In the light of Meyer's plan, it is important to notice that the elements, oxygen, chlorine, bromine, and the metalloids generally, in electrolysis, are attracted to the positive pole, whilst the metals are attracted to the negative pole. Another link in this chain may be found in the fact that the radicle alkalies are electro-positive, whilst the acid radicles are found to be electro-negative. It is stated that the hydrates take up an intermediate position, thus pointing to the fact that in their composition the state is more nearly that of balanced forces. In metathesis the architect of chemical compounds keeps such relations before his mind, and it is in this way that the family relationships of the elements are known and utilised in practical chemistry. It would seem that the fourth element in the horizontal line of elements, in the periodic scale, is that of stability, or it may be in a sense that of mutual attractivity. Nos. 1, 2 and 3 in their proportions differ from 5, 6 and 7; they are as positive and negative; and the carbon family being quadrivalent it can unite with, or be the centre of unity for the opposing elements. The same conception arises in connection with the acids and alkalies, if the one side predominates, the product is an acid; if the other, it is an alkali. In all these matters, it is possible that valuable hints may be received from Meyer's periodic plan of the elements, their atomic weights and special qualities; the voice of nature seems to speak from it, and thus the ear of the man that is attuned to the divine vibrations and thoughts, will be best able to interpret the symbols into human language.

Chemists, in their works, write about chemical combinations, which, though almost identical in their elements in all their

proportions, are yet as products found to be very different in their qualities and to those they give the name of Isomerism. One example given is that of butyric acid, a vile smelling compound, and acetic ether which is said to have a sweet aroma. They argue that although the chemical symbols and the matter are the same, there must be a cause for this difference, and they suggest that the chemical structures are built up in different ways and thus the one is a thing to be enjoyed whilst the other being offensive is repugnant. Here the index finger would point to those structures which are spiritual in kind; the analogy will hold true that the elements in the characters of men are the same, but the results may be a devil or a saint.

Another wide field of enquiry for chemists is that of organic life with all its products. As matter of fact, chemists confess that the elements of matter inwoven into living structures are few, and apart from the first and second periodic lines of the elements, only a very small quantity of the other elements enter into the combination of that which lives. There are chemists who seem to think that with a little more knowledge they will be able to annex the realm of life; they can trace no boundary line betwixt the living and the dead; organisms are only, they suppose, new affinities of matter, and they are hastening onward to conquer and subdue the dead and living. It is very difficult to sympathise with men who possess that boastful spirit so often found in arrogant, agnostic thinkers; it would almost seem as if their mighty intellects could solve all problems, and that their conquests in the past had been most marvellous; but, how little is heard of the thousand problems they have as yet been unable to solve. When they have been successful in all their efforts then the time for boasting may be enjoyed; in the meantime a little modest reserve would be greatly appreciated by those who do not agree with them; and it is certain that their voices would be heard more distinctly, and listened to with greater friendliness, if there was much less of the braggart and more of the gentle student and persuasive teacher in what they have to say. Would it not be wise to ask the question whether the organic kingdom of life is not a separate object lesson set up for men to study? This realm of thought may not be for those chemists who seek to enter by groping around in the darkness for a door and are unable to find it. The vision is a strange one; men see boastful students of science who, in their self-conceit, think that they have been able to build a great chemical temple for their own glory; and they are preparing to enter upon the living temple produced by the life-thoughts of God. It is not

to be suggested for a moment that men of science should be limited in pursuing their studies, or prevented from expressing the results of their experiments; what men wish to find in such teachers is that meekness and gentleness of temper which takes for granted that there may be secrets they cannot solve; and, that it is even possible that those who hold different views as to the words and works of God may not be altogether ignorant and completely lost in the darkness of superstition. It is one thing to skip over the surface of the things which men of science usually study in the physical world; but it is something very different to study thoroughly symbols and analogies, physical forms and living beings, which may be found to be the great alphabet of the book of God. All students are as little children in the infants' class at school, and very much will depend upon really knowing what the letters mean. The chemical alphabet of 70 letters is a large one. Is it too much to say that chemists do not fully understand their own language? Would it be heresy, or an impertinence, to suggest the possibility that they do not know the meaning of one half of their letters, and that there lies before them it may be thousands of original works which they have yet to study before they will be counted worthy to be named masters in chemistry.

If it is a great truth that the physical life with its forms is transmuted into the psychic life with its images and thoughts, and the intellectual and moral life springs out of the psychic life, then it is well to remember that the forms in the physical world are not to be lightly esteemed, but carefully studied, so that the life of man may become as one organised whole. It is possible that there is a barrier at the gateway of physical life that man is unable to get over; should this be so, then surely it is right to recognise the fact that man can be limited, and where the hand of God can be discerned barring the way, the sign should be observed as sacred. In thus referring to physical life and its manifestations, no opinion is given for or against the theory that the living arises out of dead matter, or whether chemists may yet produce protoplasmic life. There is mystery in matter and in life, as great principles; there is mystery in life, death and change into renewed life; the physical foreshadows the spiritual, that which is still more mysterious; therefore, it will be well if men of science, and all men, veil their faces and remove their shoes from their feet when they tread upon holy ground.

What then is the conception, or the vision, that rises before the mind from this very brief study of the science of chemistry? It is, taking the symbolism of the chemist, and his work, that of a

great house that is being built; it may be a temple of God not made with hands for the glory of God; or it may be an earthly palace that will redound to the glory of man. The plan of the temple is there, and even the Divine ideal may be discerned in its foundation, and in story above story which is being built. But the temple is far from complete; it has no roof; and yet the workmen are boasting of all that they have done and what they yet purpose doing. There is a motto or sign over the great entrance way, and this is the writing: "MATTER IS INDESTRUCTIBLE, AND IS MEASURED BY WEIGHT." What can these words mean? "Matter is." Who wrote these words? Where is that wise man who knows what matter is? "Indestructible." Is it an ascertained truth that God is dead, and that indestructible matter reigns throughout the universe? Alas! alas! this is a structure that is not consecrated as the Divine Temple of God; it is meant to be an idolatrous shrine; it is man that is glorified and worshipped therein; and, he calls his god, whom he ignorantly worships, "the unknowable."

THE SCIENCE OF PHYSICS.

It has been suggested that the science of chemistry points forward to the science of physics; that they are correlated; and, that in the unity of the chemical sciences, harmony may be found. The symbols that arise before the mind, as suitable for chemistry, are the mortar and pestle, the scales, and the rising structure of a great temple. When entering upon the study of physics, the symbols that take shape in the mind are a complete ring of fire or light, upon a dark background, and within the ring a magnet bar. This ring has inscribed beneath it the words, "The conservation of energy." The problems to be faced here are those forces of nature which scientific men study; and which, they say, are correlated, and can be so manipulated, that they run into each other, ever changing their forms; a unity of energy and a diversity of forces. Is it possible at any point to find an entrance into that circle of fire? If entrance is impossible, then how is the mystery of the magnet bar to be solved? Man is outside the charmed circle, can he pass through the fire and live? This is the mystic vision of the circle of the physical forces. What is the scientific aspect of this problem as men of science perceive it?

From whence arises this conception of force or energy? Is it physical or mental? The consensus of opinion is that it arises from will power; the sense of exertion as producing motion; and

thus it is mental in its origin. Force is cause, it produces effects, causes changes; and there are the alternate states of rest and motion. The state of conscious rest implies potential power; when the potential is set free, the power is kinetic and there is work done. The air, water, the earth, all matter in the state of rest, is endowed with potential energy; when changes take place then kinetic force is set free and there is movement. All of the 70 chemical elements are potential in varied degrees; when they interact and there are chemical reactions, then the kinetic chemical forces are set free to produce changes in that which is said to be the unchangeable. In all such changes energy is produced, the power that moves is called momentum, and momentum is the measure of the force produced. The force can be measured by the pressure produced, by the resistance to the force, by the weight supported, and by motion produced in a given time, when the result attained is work.

When the correlations of the physical forces are illustrated by what men know from experience and experiments, the usual way is to begin with gravitation as it can be seen in action in a stream of water, a mill wheel, and the machinery of the mill doing work. This power can be changed in its form by putting a strong brake on the machinery, because then the gravitating force is turned into heat. The heat may set fire to the mill and the chemical forces by which it is surrounded, specially the oxygen will destroy or completely change the materials. Yet these are not lost, they are only dissipated by chemical action in many ways; the carbon escapes, it is taken up into the leaves of trees and changed into wood. In due time the wood is hewn down, it is used for fuel, for heat or light; it is again dispersed abroad, enters into some other unorganized or organized object, again to change its form, and in some mystic manner to be revealed in the forms of electricity and magnetism. There is, it is conceived, one energy, but there are varied forces producing motion of diverse kinds. They can be separated in their modes of operation; they are diverse in form; and yet, from gravitation to magnetism through the circle of the forces, the unchanging energy is being changed into different kinds of motion.

It is not necessary to enter into elaborate arguments about these forces, the object in view here is similar to that kept in the forefront when glancing over the realm of chemistry. Can the method of Christ throw any light upon the problems of physics? Can the Light of the world, the Light of all ages, throw a beam of the heavenly light into this dark region of nature's mysterious forces? What is gravitation as a force? Is it potential or

kinetic, is it static or dynamic? So far it would seem men of science have not got beyond what is known as the law of gravitation enunciated by Newton; it is a power or force that can be explained in its action by this law. "*Every particle of matter in the universe attracts every other particle with a force directly proportioned to the mass of the attracting particle, and inversely to the square of the distance between them.*" But the power itself is a mystery that exists in every atom of every element of matter. It is of universal application; it is law, the thought of God revealed in matter, and here it would seem men are compelled to stop; they do not find that there is any power within themselves that they can exert to make the discovery as to what gravitation is in its essence or being. Is gravitation inherent in matter? Is it the quality that constitutes matter? Newton was not able to answer these questions; he could not believe that matter or gravitation is a material thing as opposed to a spiritual power. Is it not evident that here man finds himself in the realm that transcends the senses, experience and the intellect; he may say that no response is expected from the sphinx; he may assert with the materialistic naturalist that the mystery is solved, and that matter is the mother of gravitation; or, he may see that here the Allwise has placed a bar of limitation which man cannot cross, and the conclusion will be that as this is right in His sight, it is right, and the discussion is at an end. The problem then is not, What is gravitation, but how does it act? The reply seems to be that it is the power that unites the universe; it is the same in the atom, in man, in the earth, in the solar system, and throughout the universe. Without gravitation, chaos; no chemistry, physics, life or any science.

What is heat? Is it matter? Is it energy? or, is it only a mode of motion? The definition seems to be that it is one of the molecular forces; and the characteristic of this motion is heat. But heat must have a source, a cause. Is this to be found in matter? Heat is said to be latent in matter; or there is another phase of thought which seems to take this form, that heat, or rather energy, is not matter, it is stored in matter, and under certain conditions it is set free. The matter continues to exist, but the energy is dispersed. Matter has one face for the chemist and another for the physicist; they each claim their portion, and there follows dissolution. What would the wise King Solomon have said if it had fallen to him to give a decision on this question? It is to be feared that no mother's heart would intervene to prevent separation, the sword of justice would fall, but would the judgment be righteous? The ultimate of the

chemist is matter; and the ultimate of the physicist is energy. Are both parties dealing with ultimate symbols which to them are "the unknowable"? Or, is it possible that the two may lead a step onward to that other ultimate, at the root of matter and energy, named force?

The question therefore in dealing with heat, as molecular motion, is not as to its essence, or its substance, or any name that could be substituted to express this reality; it is what heat does and how it is found to act in this family of the forces. As already indicated, heat as a mode of motion causes expansion in volume in gases and increase of bulk in liquids and solids; and, with exceptions, the rule would be that with the decrease of heat there would be diminution of volume or bulk. Heat permeates matter, and the molecules seem to lose something of that gravitating energy with which they are endowed; they move further apart, and at certain marked stages the elements, or their compounds, change their condition from solid to liquid, and from liquid to gas. The most familiar example of these changes is to be found in ice changed to water at 32° F., and from water into vapour at 212° F. The reverse process changes the vapour into water and ice. It is known that the contraction in water ceases at 34° F., and then, by crystallization, there is expansion in the act of changing from the liquid to the solid state. Heat is evolved during the change of condition, but when the change has taken place, then the vapour, liquid or solid, take a fixed state, and there is stored in the molecules potentiality. It would be interesting to know whether all elements and compounds of a chemical nature conform to such an order. It is known that the fixed gases (H, N, O) have been liquefied and solidified under pressure and very low temperature; it may therefore be inferred, as within the range of possibility, that the densest metals could be fused into the liquid state and evaporated into gas or vapour. It is to be taken for granted that in all such reactions there will be order, proportions and equivalents that may be definitely tabulated, but to what extent this has been done it is not easy to find out. As viewed from the standpoint of heat, it will follow that every form of matter, in the static conditions of solid, liquid and gas, is endowed with potential heat, or what can be turned into molecular energy under that name.

Heat may also be compared to a kind of fluid; it has a tendency to run to a level; thus a heated body gives out heat until there is the same level of temperature, and at this stage the interchange would stop, and the balance be maintained. In

this sense heat is conducted, and the air, as a good conductor of heat, is the medium of dispersion. Heat is conveyed by convection, as when water is heated in a kettle on the fire, the heated water rises to the top, the colder falls to the bottom, and thus, by applied heat, the water may be raised to the boiling point and evaporated in steam. Heat permeates metals; with iron, as an example, it is found in the black body, it begins to glow a dark red, red, yellow and in due time the iron becomes incandescent in radiant light and heat.

There are objects which do not permit heat to pass through them freely; glass is one, whilst rock salt is said to allow 96% of heat to pass through the crystal. Heat passes through light gases freely, but not through those gases that are more dense. Heat is radiant and it is absorbed, and, like light, and other modes of motion, it can be reflected, refracted, and diffracted in its conditions of motion. Heat, as motion, as explained, has its fixed standards at the freezing point and the boiling point for the evaporation of water; all above 0° is + heat; all below is — minus heat, and these are the signs used to indicate temperature, or heat as motion. Heat is conceived as molecular motion, the motion of molecules of matter; in plus motion it is said to move in one direction; in minus motion in the opposite direction, as indicated by the thermo-pile. Is there an absolute minus state of motion, thus named heat, where the state of rest will be found? and is there an absolute plus heat so high that molecules and atoms would be dissolved, and thus what men name matter would become the one eternal, unchangeable energy? Are these mere speculations, or is man permitted freely to range with his intellectual vision throughout all the possible relations of this mysterious power, named heat?

Chemical force is the power that analysis and dissolves matter. Is there, in the circle of the forces, an equivalent to this known by any special name? On the one side there is heat, the agent that acts upon matter causing reactions, and on the other that which is acted upon; that which responds to, and corresponds with, heat. A chemical force seems a vague name, and yet there need not be vagueness in the facts represented. Heat is the power coming into matter to tear it up; but what is in matter has affinity with the heat; thus, when the predetermined rate of vibration takes place there is mutual action; what is acted upon gives up that which was potential in its structure, and the result is the dissolution of matter from the compound state into elements. It is not necessary to think of these as mutually destructive forces; they do not destroy, they set free what is

bound together. This conception of chemical dissociation may not be the line of thought followed by chemists, and yet it would seem that there is likeness in the facts considered. If this is so, then the analytical side of chemical science represents this force in all the range of its operations, and the equivalents are to be found in the chemical element table with the atomic weights and specific heats.

Chemical affinity is the force by which there is integration of matter. It may be that the name chemical affinity may not clearly define what is meant by this force; and it may be difficult to get a word that will fully express what is meant. The conception runs thus: Gravitation, as the fundamental force, attracts all matter, and all matter is subject to its law. The end of gravitation, as a force, is consolidation and static conditions; it is an active force for this end or purpose. Heat exists as latent or potential power in matter, and, under definite conditions, it is set free as molecular motion. Heat and chemical force act and re-act upon each other, and the result is chemical analysis, as expressed in the symbols of chemistry. This force, named chemical affinity, comes into view as the synthetic power found in chemistry; the means by which matter after it is disintegrated is again built up in definite equivalents, in simple and multiple proportions, as stated in the formulas of chemical combinations. As with disintegration so with integration, the forces at work are correlatives; they are equivalents; they may in a sense be said to be equals and opposites, and yet they are in perfect agreement in their physical and molecular reactions. There is the conception that disintegration produced chaos, and this new power operates so that there may arise an ordered cosmos. How is this force supposed to operate to produce chemical structures? The replies given may be summed up in the conceptions of men of science that there are combinations of chemical elements which are similar; by those elements which are dissimilar and are opposed to each other; and by development, which would mean that the process would be from the simple to the more complex forms and combinations. It is not necessary to express an opinion on these conceptions, but the suggestion may be made that dualistic methods do not seem to make these matters more simple. It is not a question of acids *versus* alkalies, or of electricity and magnetism.

Light, as a mode of motion, as one of the correlated forces, may be found to take its allotted place at this point. In the method of Christ, and in the order of nature, the fifth is always a great change—a new departure. In the Beatitudes the change

is from the receptive to the active state; from being filled with righteousness to the manifestation of the spirit of mercy. In the order in man it is from the fulness of experience in all forms of images and thoughts to the light of the intellectual power in its operations, the means by which man attains to the knowledge of truth as scientific order. Light is produced by gravitation, through heat, by raising that which is cold, inert, apparently unresponsive, by stages that can be marked to white radiant light. Again, by chemical action in the voltaic battery, there is decomposition in acid water, zinc and copper, and these potentials become kinetic energy through carbon points in the form of the brilliant electric light. The true source of light is the sun, the central power in the solar system; light and heat, energy and motion, come from the sun, they, or it, enter the atmosphere of earth, there is motion and commotion, joy and gladness, and the earth flashes back to the sun its responsive messages. Light is the great revealer of all things; by it men see, for the light, the atmosphere and the eye are all attuned to the same order of vibrations in their rising octaves. Light and darkness are opposites; but darkness is negative, it is the absence of light, the want of that which illumines the universe. The dark earth thirsts for light, it absorbs and drinks deeply of that which comes from heaven; and, at last, when the earth is surcharged with what is divine it ceases to absorb and becomes radiant in glory, praising God, the merciful, the Giver of light and every blessing. This subject of light will receive fuller consideration in connection with the science of spectrum analysis; all that is necessary here is to show that light, as a mode of motion, is the great connecting link betwixt heaven and earth. Light is the revealing Word of God as found in this brightest of symbols; it is by light permeating the souls of men as truth—true relations of thoughts—that they absorb the thoughts of God through Christ. He is the centre of the symbol; those who see Him are changed from darkness into light, they radiate forth Christ's glory and show forth His praise. The series of symbols, words, images, thoughts and persons are so linked together that they cannot be separated; this can only be done by turning the face toward the darkness, putting out the eyes so that they might not see, and by trying to believe that there is no light of truth, human or divine. There may be men who do this; they are to be pitied and blamed; in themselves they are hopeless; they are blind and miserable, utterly out of harmony with the universe; their souls are not responsive to the tender mercy of God in Christ, the Light of the world.

It is very strange that in trying to grasp the thoughts of scientific men in connection with these matters, there is difficulty in finding any clear conception of the order that exists in the physical forces. They have seized hold upon the uniting conception; but they have been unable to define clearly the correlated diversity within this unity. They have been groping their way onward, stumbling as it were upon great truths, but ever missing that divine ideal which they ought to have tried to find. The line of thought here seems clear enough; the Bible, Nature and man, point to the next force, but the name is not to be found. There is a strange blank, and it may be worth while to ask, Why this is so? The order of thought, it will be observed, has been definite; gravitation and heat are linked together as dealing with matter and energy in the lowest stages of development of the physical; chemical analysis and synthesis deal with matter and energy in a higher stage, and the analogy is the psychic; light flashes forth uniting earth and heaven, the intellectual and spiritual, and what is required is seen, it is the house of God, the moral nature of man, that building of God which reflects His glorious image. Chemical synthesis could not attain this end; it could only sum up the realm of experience and experiment, and thus be a link in the process of the development of man into the image of God. Nature is dumb, or rather the language it utters, as thoughts of God, in symbol, transcend its powers to transcribe all that is foreshadowed in them. Thus it is man that must interpret this ever-living sphinx, and man can only do so when as spiritual, in the light of divine truth, he perceives the ruin of his own nature, and is compelled to ask what these things mean? This, then, is the conception that arises here; man perceives in nature, crystals, diamonds, wonderful structures of many kinds produced, as it were, by light, through laws of light; they have imprisoned and retained the light, and yet they are only stray bits of a great ruin, of a great temple of God, which might have had an existence. A representation of this thought may be found in the great ice palace once built in Russia by one of the emperors, a dreary, cold building penetrated by light, but without life, heat, or blessing. The spring sun shines upon it, soon it is dissolved, and men may only know that such a structure once existed. The strange thing here is that such a thought could be foreshadowed in the material world; that men should think that no palace of God ever existed radiating forth truth and righteousness upon the earth; and, suddenly to awaken to the fact that this house is required; that every man's need is this very thing; and, until this end is attained, man is a

poor, helpless, ignorant creature, a mere earthly being, unable to radiate or show forth the glory of God. Alas! for Babel and its confusion; here is the result. Even the lights of science find themselves working in a world of darkness; they are still wandering in search of God's temple of truth and righteousness; it is being built in their midst; they are assisting in the building; and yet with that strange perversity that animates men, they are saying to one another, "There is no God, no temple of God, and no design or plan for a house of God. Men are doing all these things for their own glory, therefore let men worship and fall down before nature, and praise one another. Nature and man are everything and God is not; if He exists He is unknowable, therefore let His name be blotted out from the remembrance of men." How terrible must the spiritual darkness be where such thoughts can be cherished and such infamous words uttered. This is the mystery of evil rampant; poor, puny, silly men, dare to lift their hands against the throne of God, and they would occupy that throne and reign in the midst of the darkness. The vision is a terrible one; it is that of miserable, recreant, ungrateful creatures, dependent on the kind providence of God continually; receiving the gracious blessings of mercy, compassion, pity and love, and the beast in them, rather the devil incarnate, turns and rebels, attempts to strike down the hand that is stretched out full of every form of blessing. Even the divine light of truth shines upon them in their helpless, homeless condition; and the response to the light is darkness, and to the love of heaven, the hatred of hell. Marvellous is the mystery of the divine patience and love; and extraordinary beyond all conception the mystery of evil in mankind. This is the consummation of evil in its worst form; it is the climax of history; and, surely it must be the end of that struggle betwixt light and darkness, good and evil, which has persisted throughout the ages. The forbearing mercy and pity of God is very wonderful, and it is incomprehensible how men have escaped destruction from the divine light and law. Here is a vision of the divine power in purity and holiness—wholeness—and men are called to meet this problem, that law, physical, psychical and moral, is the thought and word of God. It is not wonderful that agnostic scientists should grope in the darkness when trying to correlate this divine force with the other forces. The temple of God, conceived as law, they know not; they do not discern its form within their own souls; and thus the hideous misrepresentation of a nature without God; and the lawless sitting in the temple of darkness as a god ruling a lawless universe.

Thus, no matter at what doorway man seeks to enter the divine presence to study the problems of existence, he is led onward by the Bible, by nature, and by the complex being of man, to find that the moral ruin exists; it is there; it is the awful root fact of man's condition and of his history. Amongst the nations, with their diverse, perverted religions, the clue to the solution of the problem is almost, if not altogether, lost; and it is only in the Bible, in the book of Genesis, that the end of the thread can be picked up, in the teaching of facts and symbols, as to this beginning of lawlessness, this maze in which man has been lost for centuries. Law, moral law, conformity to the will of God in the spirit of love, this is the ideal paradise of God; this is the garden of all true delights; it is the house and temple of God, greater by far than the temple of Solomon, and only to be spiritually discerned by spiritual law-abiding men, when with pure hearts they see the face of God, in Christ, the Saviour of the world. It is necessary to pause, and think what the next twin forces of nature, electricity and magnetism, may mean, for it is evident that the vision transcends that of matter and of molecular forces, and there is something new requiring to be studied in the manifestations, the relations and correlations of these forces.

What do men know about these forces, which they can now see are to be the great powers of the future for the service of man? Electricity was known to the Greeks as electron; but not known sufficiently to be turned into practical use. It was re-discovered in the second Greek age, the Renaissance in Europe; and from stage to stage this knowledge has advanced by frictional electricity, galvanism, the Leyden jar, the voltaic battery, telephony, telegraphy, by wire and air, and other forms of electro-magnetism. This history of the revelation of electro-magnetism is full of interest; it requires careful study, but the object here is not to discuss the details of this science. What is important to note is, that electricity is to man a new kind of force or motion; it is not supposed to be molecular, that is force and motion as products of matter, but a motion in that rare substance, named ether, which exists throughout all space, and is to be found in the interstices of all matter. In other words, the electric force is made manifest by means of ether, and ether is the vehicle by which it moves or produces motion. It may be difficult to follow such a conception as this of electricity, seeing it is developed from zinc and copper, or other metals, in acid water, the conclusion being that dissolution of elements, or their dissociation, implies molecular motion. Without entering into this

discussion, Is it not conceivable that the forces of gravitation and heat, chemical analysis and synthesis, light and law, are all in operation for the production of electricity? The molecular movements may culminate in the electric, and yet the electric may not be in its nature molecular. If, for example, matter may be conceived as both matter and energy, or matter endowed with energy, then is it not probable that ether and electricity, in like manner, co-exist, and that electricity is the energy of ether? Space is filled with ether; matter may be conceived as embedded in an ocean of ether; thus an invisible, imponderable universe holds within its embrace all that is material. The conceptions of scientists may not take exactly this form, but it can be seen that they are straining every likeness or analogy in nature to express what they vaguely see, and as yet are not able to define. If the product of molecular energy in the voltaic battery is said to be a current of electricity, would it flow out of matter like a stream of water, or of gas? This is not the scientist's conception of electricity, or its method of motion; it is even doubted if there can be traced a real onward current in electrification. Perhaps the stage of thought as to the definition of electricity is not sufficiently advanced for scientific men to agree as to any theory; and those who express their thoughts seem to be groping after a theory, a true explanation of what they do know. It is said to be a transference of energy, and that it flows in a kind of closed current. It does not pass into matter, like heat, by conduction; rather it plays upon the surface of that which conducts it; and, it may flow away and be dissipated, or be insulated and kept within certain boundaries. The requirement of electricity is not a tube through which it may flow, it is keeping it in upon a conductor so that it may not escape and be lost. The iron or copper wire is not the vehicle of conveyance so much as the means of transference, the road to which it is kept, so that being encircled by what insulates it may not escape. The conception further as to electric transference is by one authority said to be by a kind of double procession; if there is a current close to the wire going one way there is also outside a reverse current going the other way, and the whole conducting medium is encircled by a magnetic force which acts as if there were rings of whorls, or vortex motion, round the wire or conductor. This is one way of conceiving this problem; another, more simple, perhaps out of date, is, that a wire is electrified throughout from end to end, as in a telegraph wire, and the process of telegraphy is summed up in the circuit, communicator and indicator. Taking this conception of electricity

as practical fact, the conception would be that there exists a point where there is a high potential; this electrifies an enclosed body toward a lower potential; the medium being electrified then signals are possible by positive and negative signs, the sending or receiving pre-arranged symbols or sounds. What seems necessary in this conduction is, that no non-conductor, or insulator, shall cross its path, else that which becomes a means of resistance may be fused, the wire destroyed, and the electricity wasted.

It has been suggested that light and electricity are the same force, because it is found that their rate of motion is the same. It may be taken for granted that these powers are correlated and that they can be interchanged; but, surely, it cannot be truly said that the two forces are identical as modes of motion. If, for example, it were stated that light in its transmission from the sun to the earth is identical with electricity, this might be admitted as matter of fact, because it is the mode of motion peculiar to ether; but, this it will be observed, is a misrepresentation, for the motion does not exist as light throughout etherial space. The conception would rather seem to be that light in the sun becomes electric as it enters ether; and, in the atmosphere of the earth by etherial and molecular motion, there is a conversion into light again. Light exists in the sun; light vibrates at a certain definite rate; the atmosphere of the earth is attuned to the same rate; and the eye is in harmony with light in the sun and in the atmosphere. There is a peculiarity about this mode of motion and that by which it moves worthy of notice, and it takes this form: Scientists do not know what ether is; it cannot be touched or handled; it is everywhere; it has baffled all their attempts to explain its nature, and yet they are convinced that it exists. Here is a great faith in an invisible, inscrutable power transcending matter and molecular energy, and in this faith scientists do not stumble because of unbelief, they try to find out how electricity acts by ether and how it may be turned to practical purposes. One scientist may say electricity is a current, another a fluid, a third a double current, and a fourth may suggest that it is a motion in a kind of transcendental viscous fluid or solid, subject to vibratory motion; but upon this point all are agreed, ether exists and electricity is a mode of motion. Is there greater mystery here than in matter and molecular energy? If these are analysed to their ultimates, is it not the same story? Nothing can be touched or handled; the facts are there; there is no choice, for their existence cannot be doubted; and thus matter and energy, as well as ether and

electricity, are facts to be believed, not intellectual knowledge as found in related conditions.

Turning to the twin mode of motion linked with electricity known as magnetism, it may be suggested that here the top of the half-circle of light is reached. It is possible that scientists may see that names do not always explain facts; and it would seem that the Greek name "electron" and the modern term "electricity" tend to darkness rather than to light. The thought may be expressed, without conveying offence, that it is to be feared scientific men have appraised their own discoveries and great enlightenment in knowledge of the physical sciences too highly; they are not found sitting in the full blaze of the sunshine of truth in all its radiant brightness, but rather groping around in the darkness, and unable to find language to fitly express what they believe, and the relations of science, theoretical or experimental, to which they have attained in practical everyday life. At their own valuation, especially of those who are boastful agnostics, the uninitiated have been led to believe that science has advanced almost to the third heaven of perfect knowledge, and those who are not agnostics are left far behind in the lower regions of earthly darkness and superstition. The position, it would seem, is different; they are not safe guides to follow; and it is to be feared that they have failed to realise the difference betwixt symbols and facts, relations and ultimates.

It may be said that it is at the magnetic point in the circle of light that man is drawn, as by a strong current, into that circle which holds the magnet bar. Not every man, it must be observed, but all who are found in that condition in which there is magnetic affinity. If the negative pole of man's being turns toward the positive pole of the magnet that is within the charmed circle, then there is mutual attraction, because man finds this magnet of the universe is that which he requires; and by the act of junction there is brought about that subtle union that is spiritual and eternal. If, on the other hand, the proud, conceited, all-sufficient man, who glories in self, seeks to enter by this doorway of light, it is to find that to him it is darkness; he is diamagnetic to the light that shines around, and the magnetic influences are naturally repellent. Here the figures of thought may be physical or spiritual; the results are the same; both are trying to express truths they have not mastered; and it would almost seem that the spiritual is better fitted to express such truths than the physical. If the polarised affinities are set aside in favour of rotation, whorls and a vortex, it is to be feared that no advancement is made in seeing clearly the true meaning of the

facts. The all-important matter at this critical point is the relations of the man to the Magnet. The circle of light, the forces of the universe, centre in Him. He draws all to Himself; they become polarised by His divine power; and, by electricity, ether, the physical forces, and matter, the universe is His realm, law is His will, and to be cut off from Him is to be lost in the darkness of death. This is to wander lawless, a lost soul in the vast universe of God; and yet, most wonderful truth proclaimed by the physical sciences, the creature thus lost—unconscious of, or rejecting God—is, must ever be, the subject of the Law-giver of the universe in that order which He has appointed.

THE SCIENCE OF SPECTRUM ANALYSIS.

If the circle of fire and light and the magnet bar are suitable symbols for the science of physics, What familiar figure could be taken to represent this most interesting science of spectrum analysis? The one that presents itself is the vision of Jacob at Bethel; the ladder that extended from earth to heaven; the angels of God ascending and descending upon it in their messages of mercy to men; and, over all, the voice of God, audible to a world that in semi-consciousness dreams, and knows not how very near God is to every wanderer who has left the Father's home. The symbol and the vision have a strong likeness, a beautiful analogy; and it is only necessary to place the spectrum with the red end downward toward the earth and the violet end heavenward, with the Fraunhofer lines visible, and the ladder is there; it is the way to heaven, and the angels of light have already been seen coming to this earth from every part of the universe. Is this true as matter of fact, or is it another Bethel vision that will vanish in the night and leave behind it only the cold earth, the far-off stars of heaven, and a stone of memory and of destiny?

It may safely be asserted that this science, from the days of Newton until now, has been one of the most fascinating for scientific men; and even those who have been uninitiated in scientific details have felt the glamour of the science, and have, to the full, enjoyed the visions of truth which, from time to time, men of science have given them of a mystic world, where light reigns in the midst of all that is beautiful. It is true that the mystery of light and colour, the sun, the dark cloud, and the rainbow can be traced back to the days of Noah; and the rainbow is found to be a worthy symbol to surround the Ruler of the universe on His throne of grace and glory. This theme is cradled in the light; it manifests the laws of light by optics; and, in its onward

development, it is made the means by which the physical universe is analysed.

The story has been often repeated of the means by which Newton analysed light. He permitted a ray of light to pass through a small hole into a dark room. The ray of light came into contact with a three-sided prism, the light was refracted on its course, and there appeared upon the wall the solar spectrum, with its beautiful colours, red, orange, yellow, green, blue, indigo, and violet. The light had been analysed; that which was supposed to be one and indivisible, was then thought to be divided into these diverse colours; and these colours were supposed to be the equivalents of light as thus divided: Newton having divided the light in this way by refraction through the prism, he reversed the process by passing the coloured light through a second prism, at the suitable angle, and there emerged the round spot of white light.

The solar spectrum, as thus discovered by Newton, is called a continuous spectrum; and it is found that any white light, as from a candle, or any solid substance that is incandescent, gives the same continuous spectrum when the light is refracted through a prism. On the other hand, when the light passes through vapour or gas with a dissolved element of matter in it, such as sodium, then the continuous spectrum disappears, and in its place there appears a discontinuous spectrum, with separate lines of colour, and with sodium this is a well-known yellow line. Fraunhofer and others, when inspecting the solar spectrum, found that underneath the colours there was to be seen a series of dark lines extending from the red into the violet; when closely examined there are hundreds, even thousands, of these lines upon the spectrum, and these have received the name of Fraunhofer lines. The solar spectrum has two distinct spectrums; one radiant in colours, and the other in discontinuous dark lines. With the light of the candle, or earthly light, these dark lines are not seen, and this is an important fact in the science of spectrum analysis.

What is the meaning of this double spectrum of the sun? Why is the one bright with colours and the other dark with lines? The reason of these differences was not easily discovered, but, in in due time, it was found that when light is absorbed, the lines remain dark, but when it is emitted then the radiation is by colour; thus the solar spectrum is peculiar, it both radiates and absorbs light at the same time. If light passes from an incandescent body to one colder, the result is absorption, but if through vapour, in an enclosed space, the result will be radiation.

Light has a mean rate of vibration, as light, but when it is refracted through the prism, then the angles of refraction are roughly, for red, 13°; orange, 13° to 20°; yellow, 20° to 30°; green, 30° to 45°; blue, 45° to 60°; indigo, 60° to 70°; and violet, 70° to 90°. It is reasoned that the sun being in an incandescent state, the light passes through ether in space, by an undulatory motion, and that the atmosphere of the earth is in harmonious response with light in the sun, and with the optical organisation of the human eye. To put the matter in another form, there is a sender, a medium, and a receiver of light in its unity, and in its diversities; the sun is the sender of light, the ether, atmosphere, and the prism are mediums, and the human eye is the receiver. Substitute the camera of the photographer for the eye, and it becomes the receiver as the means of making light pictures, by a light process in the darkness of the camera. This is the explanation as to the solar continuous spectrum; but in what way can the dark lines of Fraunhofer be explained as absorptive lines in the earthly spectrum? The explanation takes this form: There is in the sun, a body, a photosphere of light, a chromosphere outside the photosphere, and beyond the chromosphere great protuberances extending thousands of miles into space. Somewhere in the sun's atmosphere, in photosphere or chromosphere not yet decided, there exists what is named "the reversing layer"; in other words, the upheaval from beneath in the sun is met, as if by a cold cloud above, and in this there is condensation, a reflection, a reversion of what ascends toward the chromosphere. If this conception is correct, then it is possible to picture something similar upon the earth upon a miniature scale, as in a dense fog-cloud over a city; the light ascending to the cloud being reflected back again with a glow over the city. This theory finds support in the fact that, when there is a solar eclipse, then this reversal layer is covered for a few minutes, the Fraunhofer lines are changed, and the spectrum is that of radiation only. If this is a true conception of the solar continuous spectrum, and of the Fraunhofer lines, then the conclusion would be that the light radiating from the chromosphere of the sun passes into the earth's atmosphere and is radiant on the spectrum; but what is reversed in "the reversing layer" becomes absorbent in the spectrum. It may be observed here that this whole subject requires very careful, accurate study. It seems to be taken for granted that light in the sun and light in the atmosphere of the earth are the same; this ought not to be assumed as scientific truth, because, as matter of fact, betwixt light in the sun and light in the earth's atmosphere there are 95 millions of miles of darkness, of ether

motion. Light from the sun, by ether motion, is changed into light on the earth, a different medium; and again this same light in the human eye corresponds with that which is light in the atmosphere. These things may be plain enough to opticians and spectrum analysts; but it does not appear as if the relations were clearly grasped and explained, when these very complex matters are being considered.

The facts of radiation and absorption cannot be questioned, they are correlatives; they are as light and darkness, they are correlated ultimates, and between them there emerges all the related conditions of heat, colour, and it may be many other relations not as yet suspected by men of science. The original, simple, and limited theory of spectrum analysis took this form: When an element of matter is put into a flame, say sodium then the flame is changed in colour and is tinged yellow, and if this light is passed through the prism, the spectrum is no longer continuous, it radiates the bright yellow line of sodium on the spectrum. If the element is lithium the line will be red upon the spectrum, and thus the conception arose that if all the elements of matter could be volatilized the result would be the complete and continuous spectrum radiant with diverse colours. The reversal of this order is absorption, then, as in the case of sodium, the yellow line is changed, it is dark and absorbent. This theory it was hoped would apply to all elements; and thus spectrum analysis would far transcend chemical analysis, and prove a more perfect means of dissociating matter into its simplest elemental forms.

This theory is beautiful; it is the child-like conception, but when fully examined it evades the grasp of the intellect, and what was a pretty picture seems to vanish as if it had little real substratum of fact. But such an experience as this is not new; it is that of history and science in the process of development; and it is what has been realised in the realms of gas, liquid and solid. The fire tries all things, and it is only by the fire that there is purgation and complete analysis. It is not easy to sum up the efforts of scientific men in this realm of thought in a few sentences; their labours have been both intensive and extensive, and the results are full of interest. They have faithfully served their generation, and the world is debtor to those who have devoted their lives to this great work of spectrum analysis.

A word of explanation may be given as to the diverse difficulties that have been experienced in spectrum analysis, and how students have not attained that goal which they have persistently sought. Experience has led them onward from the apparently

simple to the thousandfold complex, which seems to have no end. It has been discovered that if elements are simple, they are also so diverse that there is the greatest difficulty in finding out their changing forms. If, for example, iron is taken it may indicate its range of changes in nearly 500 lines. The simpler elements of the first and second lines, as found in the periodic law of elements, may not be so diversified, yet they depart from the simple lines, take flute-like forms, or find room for themselves on every band of colour on the spectrum. The difficulty seems to arise in this form: the higher the heat, or temperature, at which the analysis is made, the more diverse and perplexing the spectrum becomes. The point reached seems to be this: that if only more intense heat could be applied, then, it is probable, that by "enhanced lines" there would be a return to the simpler united lines of the Bunsen flame. The evidence points in this direction, but the heat required is not available, and so it is a question whether the end desired of complete spectrum analysis is to be reached in this way.

It is explained that the heat available upon earth for this kind of analysis would be, say about 3,500°. The heat of the sun might be 8,000° to 9,000°; and the heat of the brightest, youngest stars 20,000°. If only 3,500° of heat can be applied upon the earth to elements, then the complete analysis could not be made of all the matter throughout the universe. The theory, however, is interesting, and it deserves study, but what if degrees of heat will not solve the problem? What if heat changes its form and becomes another mode of motion long ere these extreme points are reached? These are questions which indicate how very difficult this problem seems to be; and, at the same time, suggesting that it is possible that even heat at 20,000° would not solve every difficulty.

In connection with this subject of heat, it may be suggested that spectrum analysts tend to lay undue stress upon heat and do not fully consider correlated conditions. Heat is an important relation; as energy it is the kinetic power producing motion; but the medium, ether, in space is not surcharged with heat, it may be at absolute zero; the atmosphere may be cold and the human eye at the temperature of the blood. Heat is motion at definite rates of vibration; but is this motion heat, as it is refracted by the prism and made manifest on the spectrum? The key-note may not be intense heat; rather it may be the pre-arranged vibrations of molecules of matter and these range from low up to very high numbers. If at a temperature of 1,000° copper was introduced to be fused, what lines upon the spectrum would the

onlooker expect to see? That of the single copper line. How could this be the result, seeing that the metal would be in the state of gradual fusion, and thus in the light there would be all the range of vibrations from black, red, etc., up to white incandescent light? If this aspect of the question is considered, is it not correct to say that the light containing the element must have a unison of vibratory power; and that the motion will not have a one-line spectrum unless there is attunement to the same rate of movement? If, therefore, spectrum analysts could find this perfect unison of the elements in light, and of lines upon the spectrum, and could strike the true key-notes of the elements in a perfectly pure condition, then the ideal spectrum might be made manifest as suggested by men of science.

There is, however, a tendency, by spectrum analysts, to carry the analysis of matter beyond that of chemical elements. They suggest that the hydrogen atom might be divided into hundreds of ions, and that these ions would be matter carrying with them an electric charge. The matter of these ions, although giving different spectra, being one matter under different conditions. If then many ions make up the atom of an element of hydrogen, would not, for example, they reason, the Kathode rays be matter in a new state; and would not this be the one substance from which all elements of matter are built up? This theory tries to account for the many lines of one element upon the spectrum; but it is difficult to see that there is any gain; because, no matter how far the analysis carried, the facts still remain the same; the one cause is light, and all lines of elements, atoms, ions, or lines of force, are the innumerable diverse effects of that one light.

It is a question that may be asked even by the uninitiated, whether spectrum analysts have really considered this science in all its heighth and depth, its width and breadth? Have they been confining their attention to a limited part of the spectrum and leaving out of view more than the half of this extraordinary revelation from light? The impression gained from reading works on spectrum analysis is that the attention of the workers has been directed particularly to that part which is observed as coloured upon the spectrum; and little notice taken of the infra red or the ultra violet extensions. It may be true that this is the only part where analysis of light, colours, and elements can be traced; but if they deal only with a portion of the spectrum, how can they expect to discover all the truth the message of the spectrum bears to them? It may be supposed that a spectrum analyst would put this question to himself, Whether as an observer of the relations of light, he would be justified in limiting

his enquiries to the coloured part of the spectrum, and, if he did so, would there not be the great risk of omitting truths which would probably be of importance in connection with the whole subject? For example, elements are known to have their lines upon the red, blue or green; others have double lines upon one part, and single lines upon another; and some seem to range the scale as if they were in harmony with all the colours. What then, the question may be asked, if the light rays refracted through the prism find their places in the dark ends beyond red and violet? Have they no meaning and are they not worthy of study? If light is a unity and the spectrum from end to end its diverse manifestations, then how can the riddle be solved, the symbols understood, if only a small portion of the symbols are studied?

The fact that the solar spectrum is so much longer than the visible part is well known. Becquerel, a French scientist, made a photograph of it; and Draper, in America, about the same time, attained the same result. They state that the visual part is only one portion; that beyond the infra-red there are two parts, and beyond the ultra-violet there are about four parts. Professor Stokes asserts that the ultra-violet is about six times longer than the visible part; if this is so, then it is evident that the spectrum is not exploited, but rather that there are regions within its boundary as yet little known by man.

As the object in view here is not to discuss scientific theories, nor enter into the details of the sciences, but to find out whether the method of the Lord Christ can be discerned in them, it is now time to question this science of light and spectrum analysis if any such method can be discovered within its ample boundaries. If the question were put as to the appearance on the face of the spectrum, the reply would be that the sevenfold range of colours from red to violet is in harmony with that method; but in the present undecided state of the science of spectrum analysis this is too narrow a basis to build upon, and, so far, it has not fulfilled its ardent hope of transcending the lower realm of chemistry. It is felt that much more is required of this interesting science; there is surely in it more than can be found in physics or in chemistry. These are lower in their order of thought: chemistry is so closely linked with matter that it may be said to be an earthly science with spiritual signs; but the student is unable to leave the symbols or rise above them to spiritual thoughts. The science of physics intervenes, and as energy is more spiritual in its nature, the earthly and the correlated forces ascend by stages until, it may be said, they draw man very nigh to the footstool of the divine mercy. With spectrum analysis the theme is light;

and thus there comes the inspiring hope that with light from heaven, a more perfect vision of truth and of the method of Christ will be granted to men.

Looking at the spectrum as a means to such a divine end in the light of Christ's method, with the reflections that come from chemistry and physics, this is the vision of truth that dawns upon the soul. The spectrum may be discerned as having an eight-fold division, and that division specially operated upon by spectrum analysts is only one of them. The division immediately below the red, as is well known, is dark; but it is that portion upon which there is manifested heat—the portion beyond the heat ends the spectrum; and, strange to say, the power that resides here may represent gravitation. How and why this conception arises will be explained later; in the meantime the thought is worthy of consideration. The third division upward is the visual coloured part, and it will be sufficient to indicate at this stage that it fits in with the spirit power in man that looks out upon the universe, in its seven-fold diversity, is touched by all that is seen and responds in harmony with all the related conditions. This is a strange vision of truth—one of the strangest—yet one of the most beautiful illustrations of the marvellous harmony of the method of Christ conceivable. The next division is even more strange. Here men stumble upon the portion of the spectrum that has to do with photography—the actinic portion, and as men ought to know, this is in harmony with that part of man's nature thought of as the mind or memory. The spectrum reveals how in the darkness the light prints pictures as the science is made known in photography; and this is in harmony with that part of the nature of man that is psychic, as derived from the special senses in images, ideas and thoughts. The next division is said to be that where fluorescence or luminescence takes place; in other words, there is the emission of a kind of phosphorescence, and this has been divided into eight sub-divisions. The names given are chemo-luminescence, photo-luminescence, thermo-luminescence, tribo-luminescence, electro-luminescence, crystallo - luminescence, lyo - luminescence and X-luminescence. These are said to take place in chemical changes, in transient or persistent fluorescence and phosphorescence, in minerals when heated, and in kathedo manifestations. The analogy with man is in his intellectual nature, but here nature may be said to be reflecting the light that is in it. Would the divine light from heaven, according to the method of Christ, be in man light or luminescence? It is a strange question and the analogy is one worthy of consideration. It

may be noted here as possibly worthy of attention that upon this part of the spectrum there is no trace of the effects of molecular heat: the temperature at the violet is as 1, upon the green 2, upon the red $3\frac{1}{2}$-$4\frac{1}{2}$, and upon the infra-red dark part it is greatly increased. The inference may fairly be drawn that the earthly molecular mode of motion is at an end; the region is etherial or spiritual, and the division beyond that of the luminescent may be conceived as crystalline. Chemical action has been suggested as having to do with this portion of the spectrum, but as with chemical action there would be the manifestation of heat, this conception does not fit in. This is the sixth division; and it is the same problem that was found to be difficult of expression in connection with the sixth force. Crystallization; the House of God; law, as the result of light, seems to express the conception, and the analogy in man is his moral nature. The next division would seem to speak of electricity and ether, of movements not molecular or of the earth, and the analogy here is the realm of Christ's grace and mercy, as made known to sinful men. The eighth division coincides with magnetism; and what that represents in the nature of man and the kingdom of God's love has been suggested. It is only necessary to add that, although these suggestions may seem to have little scientific support, there are facts of science waiting for explanation which may fall in with what is here conceived as the method of Christ. It is here that the Kathode and X rays may find an explanation of their method of operation. It has been suggested that there are rays of a mysterious nature which are not subject to the law of refraction or reflection. Would not this be the condition of the magnetic portion of the spectrum as seen visibly in the lines curving round the top and drawn downward in the magnet bar when it is surrounded by steel filings that cling to the surface at the ends of the magnet?

This vision of the spectrum requires one more thought to be added to the picture. It has to be lifted up before men that they may see this most wonderful revelation of Divine light and truth, given to them in the days of darkness, for their illumination, so that they may take heart of courage and gaze upon this Divine ladder that reaches from earth to heaven. From earth to heaven—these are its limitations. It descends to the earth's centre, to that point where gravitation, as the strong arm of God, keeps all things in their places; it ascends to the very throne of God in His grace, mercy, compassion and sacrificing love, thus drawing all men to Himself. All men can sit down at the foot of this ladder, and if reconciled to God through Christ, the Son

of God, they may rest in peace and safety, for He has promised to be with them in their journeyings, to protect them from evil, and to bring them back again in peace to the Father's home in heaven.

THE METHOD OF CHRIST APPLIED.

By using the method of Christ through the dark region of matter and energy, chemistry and physics, there has been development of thought of a remarkable kind; and it may be fairly assumed that the quest in search of truth has not been in vain. Spectrum analysis and light, with the diversified conceptions which arise out of this science, seem to lead men into a higher realm of thought; the spiritual transcends the physical, and the question which will present itself, is whether the spiritual has not, in a real and true sense, completely overshadowed, or rather transfigured, the physical? Surely the light on earth has become radiant in response to the light from heaven; there has been spiritual telegraphy; the heavenly symbols have been interpreted, and the intelligent study of what is divine may now be easier.

What can all these things mean? Has the Lord Christ, with most gracious condescension, been revealing Himself to the sons of men in another form than that of Jesus of Nazareth, the Man, the Son of God, Saviour and Sacrifice for sin? Has He been sojourning in the midst, going out and in amongst men, and yet they have not known Him? He could not appear again in the form of man, for that stage of development is long past; and yet, is it not true, that for two centuries He has been conversing with men, by the way of scientific truth, they have not known Him, His friends have failed to recognise Him, or to see the nail prints in hands and feet, the pierced side and the broken heart. What shameful, dull scholars His disciples have been; how hard of heart, how materialistic, how worldly, how unfit to rise above the visible and tangible, never to be able to comprehend that behind all this flood of light of truth being outpoured upon men, there was Christ, as the Way in which men have been travelling; Christ the Truth, the very light of heaven, upon the way; and Christ, as the life in every man in the way walking in His light. The position is truly a critical one; it looks as if He has been with men all these years, and yet their eyes have been so holden by earthly thoughts, that they could not discern Him. At last He appears to be weary teaching such disciples, and His word is "I go away." Is it so very strange that these words should strike upon the ears of men as a judgment upon them because of their

blindness and perversity, their ingratitude and their folly? Here is the Lord from heaven in the very midst of men and not a single soul able to recognise Him. Men have asked Him ten thousand questions, and he has graciously answered them. He has even condescended to give His richest gifts to men who denied His pre-eminence and who brutally told Him that He was ignorant, and that they would not allow Him to reign over them. Of all the generations of men surely there have been none more culpable than those who have been living in the light of religious liberty, state freedom and scientific light. In the age of the Spirit they have been carnal, ambitious, perverse, worldly and self-willed, and thus it may not seem so very strange if heaven and earth, yes, even the dust of the highway, the flowers on the pathway, the leaves on the trees, and the birds in the air, were speaking to one another and saying, "Will He go away?"

This is the state of matters; the earth and the universe have become uneasy; and even agnostics with their strange perverted thoughts seem to feel that the horrible darkness is closing in around them. They have conjured up an evil spirit, to sit upon Christ's throne; the atoms of nature quiver with a sensation they cannot express; the universal soul in atom, and man, in molecule and through all nature, shrink as with a feeling of horror, because man is so unmindful of, and ungrateful to, Christ, the Fountain of Life, the Light of heaven, the Saviour of the world. Has Christ revealed Himself to men by His Spirit, in spiritual form to spiritual men? Is this method of Christ a spiritual reality, a true revelation in, and by, the Spirit to men? Is it true that His method and His alone can solve those many problems which have occupied the attention of men throughout the ages? He has condescended to talk with men in the most familiar way; He has in every stage of enquiry responded with the most gracious patience and kindness; and now, ere He depart, if men will not acknowledge Him as Lord, is it unreasonable to expect that He should enquire whether men even now understand His method of work for the salvation of men?

What is the meaning of the vision of spectrum analysis? Is it not that of Christ as revealed by light, concentrating into the spectrum, what men may be able to see of His Majesty and glory? Consider the beautiful symbol in its range from infra-red to ultra-violet, from gravitation to magnetism, and is not the name of the Lord Christ inscribed upon it as the light of the world and as the way of light from earth to heaven? The spectrum is the consummation of the visible and tangible universe; it synchronises with and explains all that is lower in the

order of development; and it is the visible symbol in radiant glory which spiritual men may study for their advancement in knowledge. It is only the spiritual man who can say this symbol is the revelation of the method of Christ, and His name is written in letters of light upon its face.

If the solar spectrum is laid alongside a magnet bar, what likeness or affinity is there betwixt the two symbols? Surely, it is not necessary to explain in what way the two objects, so very different in appearance, utter the same great thoughts. The magnet is only a bar of iron or steel, but every atom of it is magnetised from end to end; and every severed atom becomes a perfect magnet. At one end the magnet attracts, at the other it repels, in the middle there is a balance of forces; yet the magnet is so constituted, ordered and manifested, that it dumbly speaks of gravitation, of possible heat, light and colour, of chemical changes, electrical movement in ether and that magnetic attraction which draws to it that which is different in its electricity or polarity. This dumb, dark thing, if it could speak, it would say: "I also reveal Christ and His method; it is not radiant from me; I have absorbed it, and it is written in every atom of my being."

When the spectrum is laid alongside the physical forces, and their movements in that circle where all around is darkness, then it seems as if the circle became a line; it has coalesced with the magnet bar; they are one, and the magnet bar is become radiant with light, heat, chemical forces, electricity, magnetism and gravitation. The energy thus manifested is the Divine forces conserved in Christ and correlated for His service. Here also men may find Christ working in His own way, by His own method; and the physical forces are His servants, ministers of His appointment, doing His will throughout the universe.

Let the spectrum be applied to the first line of chemical symbols beginning with lithium and ending fluorine, and what will the result be in the light of Meyer's plan, the atomic weights, and the characters of the elements with their affinities and methods of chemical combinations? It is the same story the elements vibrate in unison with the lines upon the spectrum; they are as brother and sister; the earthly man and the angel from heaven talk with each other; they are friends, and the Friend who has made known the near relationship is the Lord Christ by the way of light from heaven. But the vision of the periodic law of elements stretches far beyond this conception of relationship of the spectrum with one line of elements; there is foreshadowed the whole twelve-fold kingdom; and each horrizontal line may in like manner reveal Christ as Lord.

If this conception of the spectrum, as the radiant Divine light, is applied, as an intellectual ideal, to the whole order of nature, would there be any response? Would the infinitely great confess that it also bears the same image in space and time? It is only a change of terms, other names require to be introduced, but the facts are the same. Nature in its unity is Christ; the diversity is force, life, spirit, mind or memory, intellect, the moral nature, grace, suffering and sacrifice, and these are the principles inwoven in nature as the method of Christ. Lay the spectrum alongside these principles and see how they agree—gravitation and force, heat and life, radiant colours and spirit, photographic actinic power and memory; luminescence and intellectual power; God's house and law and the moral nature of man; electricity and grace; magnetism and the mystic union of Christ and His disciples in sorrow and suffering. Christ is the universe and the universe is Christ; but men ought never to forget, that, so far as they know, only upon earth was He clothed with the grace that is Divine, and it was upon the earth He wore the crown of thorns and made a cross His throne. The cross has one message to men, "Behold the Love of God"; this method of love is by suffering; and the supreme, all-sufficient sufferer, and saviour of all men, is the Lord Jesus Christ.

When the microcosm of nature—man—is taken, then what will the result be? The choice must not be any man, but the one perfect man, Jesus Christ. There is found in Him all that is ideal in nature, and all that is beautiful and true in the spectrum. With nature the development of thought would be from matter upward to the Divine manifestations of the work of Christ and His disciples as one body; but, with Christ, as man, to understand Him, the order may well be reversed, beginning with the Divine, the moral and intellectual, psychic, the bodily form, then all are seen to be Divine in their nature. The Son of God, and of Man, has in this sense been analysed to His ultimate thoughts by men, and He has survived the criticisms of friends and enemies. Men have tried to build up their characters in truth, righteousness and grace, and the symbol, the sign of the perfect man, is Christ. The Beatitudes are the germ centre of His being and of His kingdom; and this means that the method of Christ reveals Him to be the Light of the world, the Temple of God, and the Fulfiller of law in the light of the truth of God.

The perfected spectrum, as scientific men hope to see it, and the perfect Christ are in unison. As yet the responses of the spectrum fail because man has failed to comprehend all that it means; and is it not equally true that their failure has been

even greater when trying to apprehend the perfect manhood of Christ. In the language of science He conformed to the laws of matter and molecular energy; but there was around Him, and penetrating every part of His being, the Divine ether, which is above matter, and is the vehicle of the Divine energy. The analogy is a peculiar one; it is a revelation to this generation; it presents in a concrete form a new power, miraculous in its way, because it is not subject to the general laws of matter. These higher powers in nature, electricity and magnetism, do rise above the molecular forces; as explained, scientists have failed to define electricity, and is it not true that magnetism, in a sense, combines the force of gravitation with attraction? Here the problem, in Christ is not what is earthly, it is His Divine nature, and, it is a strange thought that even, in the region of matter, space and time, the Divine is in this way foreshadowed. The fulness of the meaning of this analogy is not limited to Christ; this is a portion of His method; and, as stated in the Bible, His disciples and friends are elevated to this divine state; and He is not ashamed to call them brethren. When He appears in His glory, in the light of radiant heaven, and finds a responsive, earthly radiance, then His redeemed will be like Him, and they will be privileged to see Him, not as men have drawn his likeness and portrayed His character, but as He is in glory.

At this point the magnet bar, the physical forces and chemistry seem to have altered their message; and the picture is that of Christ, the Light of Truth, the Living Magnet, the Manifold Way, in every diversified form and condition of things, as central; and all men as being drawn to Him. The physical, with the added spiritual, in Christ is made manifest, and men are seen walking in the darkness. Why? The reply must be that they have not spiritually seen the Light of Life. This is a strange thought. What can the meaning be? Is it not to be traced along this line; men have seen only a man. Many Jews saw an impostor and a malefactor; some saw a good man, and His death ended their hopes, because the Jewish Kingdom with its hopes remained unfulfilled. Therefore, it is at this point that the earthly terminates, but not before there has been introduced into it the Divine, the Heavenly, the Spiritual, the Immortal. The culmination of the earthly is in the awful darkness of Golgotha, the cross and the grave of Christ. Here in the darkness that surrounds mankind through sin, there flashes forth before the spiritual vision two thoughts, and in these men see the eternal High Priest of mankind, and the eternal Altar and Sacrifice for sin, for the sin of the world.

This vision is spiritual; it is the heavenly Christ; it is where no mortal man can stand beside Him. Here He is alone—the Saviour of the world. It is from this flash of light out of the awful darkness, the total eclipse of every form of worldly light and glory, that the vision is again extended in a new form, and light and the spectrum are again found helpful. The conception takes this form: the Spirit of Christ, the Spirit of Truth, is in all these revelations from God through Christ, and the question to be asked is where will men find this spiritual manifestation thus foreshadowed or symbolised in the spectrum? The answer is that the Word of the Holy Spirit is to be found in the Bible, and it is the Word of God alone that makes known to men the way of salvation from sin. To put this matter very briefly, the method of Christ in its eight-fold manifestation, in harmony with the spectrum, is to be found in the Bible, and the spectrum may guide men to a better method for the study of God's Word. These are the natural divisions of the Bible: 1. From Adam to Noah, the age of utter worldliness, sin, condemnation and the reign of death. 2. Noah to Abraham, that of new life and energy, from which all men in all nations derive their fundamental spiritual power. 3. Abraham to Solomon, with its eight-fold manifestations of the beginning, the rise, the fulness and the consummation of the visible kingdom of God upon the earth. 4. The Books of the Bible from I. Chronicles to the Song of Solomon, as conveying to men the photographic pictures of history, experience, wisdom and love. 5. The Books from Isaiah to Obadiah, foreshadowing the luminescence and the glory of Messiah's Kingdom. 6. The Books Jonah to Malachi, which speak to men of the mission of the Jew to the world; the state of the world in its apostacy; the prophet on the watch-tower; the re-building of the House of God, and the coming of the Sun of Righteousness. 7. The Christ, the Man, the Son of God. 8. Christ as the Sufferer and the Sacrifice for Sin.

If the spectrum of solar light is laid alongside this spiritual spectrum of the Bible from Adam to Christ, it will be seen that the analogy is even more complete with more perfect harmonies than those which are found to exist in the realms of physics and chemistry. This is the eight-fold method of Christ in the Bible up to and including His own life and death; but it is as yet unknown to men in how many ways and under how many forms—all diverse, all repetitions of the same divine method—these are to be found in the Bible. It is here that the manifold diversities found in the solar spectrum and the spectrum of sacred scriptures, with its manifold diversities of spiritual life, are found to agree.

Both are symbols: one by light and its manifestations, and the other by the Spirit of Truth revealing to men the method of Christ in word and deed.

In this great realm of the Holy Spirit men may see the third division of the spiritual spectrum as contrasted with the third in the natural, and as fulfilled all that is involved in the great third division from Abraham to Solomon. In other words, the natural and the earthly extends from one to six; the spiritual begins with Christ the seventh; as sacrifice for sin He is the eighth, this is the stage of atonement; the ninth is the revelation of the Holy Spirit witnessing to Christ, it is the ninth in the Kingdom of God, and the third in the realm that is spiritual. The next stage is conceivable as the special work of the Holy Spirit in mankind through Christ and the Gospels, by the Apostles, as related in the Acts and as made manifest in the letters of Paul to the Romans and Corinthians. If the spectrum of light is laid alongside these eight books, and the analogies are studied, there will not be any difficulty in tracing the work of the Holy Spirit; and this is from the darkness that covered the earth at the coming of Christ up to the benediction of "The grace of the Lord Jesus Christ and the love of God, and the communion of the Holy Ghost," as uttered upon all men in all the nations of the earth.

In this way the Holy Spirit was revealed, moved men, and sent them forth into the world, that they might be witnesses to the truth that is in Christ, and to be apostles to men, so that they might know that Christ lives and reigns in glory. The remaining Books in the Bible, as a spiritual revelation of the method of Christ, is comparable to the fourth division on the solar spectrum, the photographic and the psychic; or the realm of experience in the Christian life. With the method of Christ kept in view it is interesting to study the Epistles from the story in Galations of the relapse from spiritual religion to earthly Judaism, upward and onward through manifold experiences to the utterances of the beloved disciple in his letters teaching men the truth about Christ as the Light of the world, the Life of man, and the manifested Love of God.

This way of looking at Christ, at nature, man and the Bible is worthy of careful consideration; it is Christ's method, as indicated by the Beatitudes, and it is in harmony with scientific knowledge and philosophical enquiry. It is hardly necessary to add that the whole system of thought is monistic; in other words, it matters not how many and diverse the manifestations may be in this method of Christ, the ultimate is always the one named the Reality, or God. Those who have considered these problems

during the past 30 years or more, know what a struggle has been going on during that period betwixt theologians and spiritual thinkers and teachers on the one side and the evolutionists and agnostics on the other. The campaign has been a strenuous one; and if there appears to be a desire to call a truce to prepare for peace, it is not yet made clear upon what terms peace is to be declared. It is now seen that the early utterances of Mr. Spencer, in his philosophy, will require to be accepted by all those who understand what the struggle has been about; his definition of knowledge into science arising out of experience, as claiming the whole realm of related truth, and, the "unknowable" as fact behind all relations, and as embracing theology or religion, holds the field. Had Mr. Spencer realised the importance of this "unknowable" as reality and chosen the pathway that leads to God instead of that tending to naturalism and mechanism, then men might have found cause to thank God for his labours, which have been very abundant, as well as for that keen analysis which cut to the very roots of every method of thought and left men with faith in the invisible and the "unknowable," and that mighty empire of knowledge attainable by man by his intellectual powers. Mr. Spencer's method of thought throughout is monistic; it leaves the "unknowable" as unworthy of attention and it proceeds to formulate the whole realm of knowledge known to man intellectually as evolved from an ultimate force and made manifest, apart from any supernatural power or Divine intervention, by natural and mechanical means. If it is granted that this division of knowledge into that of faith or natural belief that an "unknowable" exists, and that the manifested creation is knowable by the intellect, it does not follow that Mr. Spencer's conceptions as evolved in his philosophy are true, or that his method and order of thought is satisfactory. His scheme of the universe and its evolution, it has been asserted, do not explain or harmonise all the facts, and he omits realms of spiritual thought which men will not permit to drift away from them into the ocean of the past. The point reached seems to take this form: the intellect of man can claim the realm of experience and of science, but that other realm of faith in God or belief in an "unknowable" must be left open and free for both parties. So far, it is well. It might have been possible for both parties to have gone on peacefully putting in order all that experience or science could teach, and it is within the range of possibility that those who were looking at these regions of thought from different sides would ultimately have come to see that their differences were

about words and symbols, and that the true interpretation of the facts would bring agreement. Unfortunately, such a method has not been followed, and the struggle of the past thirty years has been, in some ways, disastrous in its results. If these remarks have been understood, it will not be difficult to see that a monistic philosophy, whether spiritualistic or naturalistic, finds its root in the reality that exists beyond and is the cause of all relations of experience and science. It is even correct to state that this ultimate is in the nature of things and of the thoughts of men, spiritual and not natural or physical. It is a philosophical conception, an abstract idea, a symbol used by both parties to express a truth of consciousness which both believe and cannot deny.

It is important to understand this root problem, and it is right to acknowledge that Mr. Spencer appears to have been the first to clearly perceive this great truth. The facts of his philosophy which are built upon human experience and science are of high value, the difficulty is found in following him in what is a philosophic theory of mechanical naturalism, and it would seem that this portion of his work has not been for the welfare of mankind. But it is necessary to turn away from Mr. Spencer and the first bugle call that led to war, to consider as briefly as possible the latest utterances of one of the same school of thought in Germany, who seems to be a master, if not the headmaster of all who hold similar naturalistic or agnostic views. It is far from pleasant, it is painful, to criticise the utterances of an old man, tottering on the brink of the grave, one who has been a leader of men for many years, a master in science and philosophy, but who has sent forth thoughts to the world which cannot, in the nature of things, bring blessings to men. Professor Haekel, of Jena, may possibly represent the very extreme thinkers of the naturalistic evolutional school; and it is to be hoped that there are not many men who would care to follow him in his extreme views. It is well to remember that he represents the full development of the system of thought, and that it is possible those who have accepted his teaching would follow in his footsteps and eventually reach the same goal.

In "The Riddle of the Universe," at page 237, it is stated: "Our monistic view, that the great cosmic law applies throughout the whole of nature is of the highest moment. For it not only involves on its positive side the essential unity of the cosmos and the causal conception of all phenomena that come within our cognizance, but it also, in a negative way, marks the highest intellectual progress in that it definitely rules out the three central

dogmas of metaphysics—God, freedom, and immortality. In assigning mechanical causes to phenomena everywhere, the law of substance comes into line with the law of causality." Again at page 215: "The supreme and all-pervading law of nature, the true and only cosmological law is, in my opinion, *the law of substance;* its discovery and establishment is the greatest intellectual triumph of the nineteenth century in the sense that all other laws of nature are subordinate to it. Under the name of 'law of substance' we embrace two supreme laws of different origin and age—the older is the chemical law of the 'conservation of matter,' and the younger is the physical law of the conservation of energy.' These laws are 'The law of the persistence, or indestructibility of matter,' and 'The law of the persistence of force, or conservation of energy.'"

These statements should be considered in the light of a paragraph at page 307: "The presentations which fill up the gaps in our knowledge or take its place, may be called in a broad sense 'faith.' That is what happens continually in daily life. When we are not sure about a thing we say, 'I believe it.' In this sense we are compelled to make use of faith even in science itself; we conjecture or assume that a certain relation exists between two phenomena, though we do not know it for certain."

The modest statement in the last sentence is worthy of a scientist and a philosopher; but the other paragraphs seem out of place, as conceived or uttered by any man. Professor Haekel clearly comprehends all that is involved in Mr. Spencer's definition of related knowledge as cognizable by the intellect of man, and that other realm of thought termed "the unknowable"; and he agrees with that definition. Is it possible that Professor Haekel gave due consideration to the thoughts here expressed; that he remembered the limitations placed upon man's intellect, by what he believed; and that, as a man, it was his duty not to give utterance to such thoughts unless they could be fully proved to be true? Is it not the plain truth that substance, matter, energy, and similar ultimate terms, cannot be defined? Science shrinks from the very thought; philosophy as if paralysed can only look at it helpless; and even theology has utterly failed to apprehend or define what the reality of substance is, or in what way man should try to conceive the thought. This is surely a mistake of the gravest kind; it is an assumption of knowledge which no well-balanced mind would entertain for a moment, simply because it is so well known, and the consensus of opinion is so strong against such arrogant conceptions. But it is possible that Professor Haekel may reply that no such assumption

is made by him as to what may be conceived as the essence of substance, and that such conceptions are out of place in considering his argument. His reply would be reasonable if he did not go on to assert that in a negative way, this knowledge possessed by him ruled out of the thoughts of men, as truths believed by them, "God, freedom, and immortality." Who then is Professor Haekel that he can by the writing of a few words, one or two symbol signs and thoughts, blot out of the universe "God, freedom, and immortality"? It is simply staggering, incomprehensible, that any creature should be found, thinking such thoughts, arrogating to himself such powers, and evidently unable to comprehend that he is destroying himself and grievously wronging his fellow-creatures, who wish to respect and honour the scientist and philosopher.

It is necessary in the interests of truth to try to comprehend what is involved in this "law of substance" enunciated by Professor Haekel; it is summed up in the conservation of matter, or its indestructibility; and the conservation of energy and its persistence. These are great truths; but surely it is incorrect to say that they are newly discovered, and that science and agnosticism are there parents. When the thoughts that are really at the hearts of these terms are considered, it is not difficult to see that they mean precisely what is amply included in the great words, "Eternal" and "Almighty." Agnostics and infidels take their idols of the nineteenth century, clothe them with new scientific and philosophical clothes, hold them up for the admiration of the whole world, and they do not seem to understand that they are dealing with the same mystery contemplated thousands of years ago in Chaldea, Egypt, Persia, the far East, Greece, Rome, and in Christendom. The reality is the same fact in all the ages; and it is difficult to conceive in what way Professor Haekel thinks he has solved this problem.

The Professor may say, I have not claimed to discover that mystery, but I have correlated the two facts, and I have named them the "Law of Substance." But this is mere sham; it is playing with words; it is attempting to subvert truth; it is a wilful misrepresentation of truth for a base end, to glorify man and to exalt a system of thought. What is the definite meaning of law? Is it not the true intellectual conception of order, function, method in nature, as expressed in scientific thought, as in chemistry or physiology? Law is not an entity, it is the light of truth shining full and clear upon and within the soul of man, as he reads the thoughts of God in His books of nature, providence, or redemption. Is not this the truth, that substance, as ultimate,

is beyond law; it is beyond man's powers of definition; it is lord not servant; in fact, it is absurd to attempt in any form or shape, in image or language, to make the Eternal, the Almighty, matter, or energy, as *ultimate*, subservient to law. As in religious thought, man is permitted to correlate the Eternal and the Almighty into one name, God; so in the sphere of philosophy it may be suitable to correlate matter and energy and give them one ultimate name, force. In either case the thinkers are dealing with the same reality from different standpoints; the one from the heavenly, where God reigns and where His name is honoured; and the other from the depths of darkness in a human soul that has despised and rejected God. There seems to be in connection with matter and energy a kind of mystification which is not satisfactory, and certainly it is not scientific. Can it be demonstrated that matter exists? In other words, Is it as clear as the daylight, that what is named matter is not changeable into energy; and that energy cannot be changed from "lines of force" into atoms and molecules? It can be observed, that in the thoughts of scientific agnostics, there is a want of clear perception upon this point; the theoretical philosophers bridging the gulf by resolving the two into the one ultimate, force; whilst materialistic thinkers love to dwell upon the thought that there is no God and that matter is the eternal. In whatever way this subject may be finally accepted, the root facts will remain the same; the Reality, beyond all related truths, cannot be intellectually defined by men. When, in their ignorance, they use such words as persistence and indestructibility, and assert that the sum of matter is unchangeable, they are merely playing with words, signs and symbols; the facts lie behind the words; there is a sense in which they are true; but thinkers ought to be careful to convey to men in what sense they speak and under what limitations they conceive their thoughts.

Professsor Haekel, in his book, refers to a lecture by Emil du Bois-Reymond delivered in Berlin, where the lecturer stated that there are seven world enigmas, which it is doubtful if man will be able to solve. These enigmas are as follows: "1. The nature of matter and force. 2. The origin of motion. 3. The origin of life. 4. The orderly arrangement of nature. 5. The origin of simple sensation and consciousness. 6. Rational thought and speech. 7. The question of the freedom of the will." Professor Haekel asserts that Nos. 1, 2, and 5 are solved by his discovery of the "law of substance," and that Nos. 3, 4, and 6 "are decisively answered by our modern theory of evolution; the seventh, and last, the freedom of the will, is not

an object for critical scientific enquiry at all, for it is a pure dogma, based on an illusion, and has no real existence." If any doubt existed as to what is asserted by the "law of substance," as enunciated by Professor Haekel, it is here made plain that it covers the "nature of matter and force, the origin of motion, and the origin of sensation and consciousness." The first is that final cause which scientists and agnostic philosophers confess they cannot discover or define; the others, 2 to 6, seem to be held in abeyance; their faith is that it is possible, that evolution and the future, by the great intellectual powers of men, may find the connecting links, and then from chaos to cosmos the whole natural mechanical order of evolution will be known. Such a faith may be respected when it is expressed as a faith and hope and not uttered as a dogma without proof. It is possible that the method of Christ may in some way throw light upon these enigmas; therefore, until the pathway of light by the intellect is clearly seen to terminate in that darkness which man cannot enter and live, it is difficult to conceive how one man can say to another: "Thus far and no further." The solution of the seventh enigma would seem to be a kind of intellectual joke proposed by the philosopher of Jena. This sweet, innocent, gentle automaton, never knew that he had a will of his own; he was never conscious that he could use it; he never thought that he possessed freedom to utter his thoughts, and so he could not conceive it to be possible that those who opposed his views could possess any freedom of will. Is the whole order of his thought a farce, and is this the key to the solution of all the problems he has studied and made known to men? It is quite refreshing, after such a serious discussion, to picture before the mind a smiling, quixotic face, gravely saying: "It must be true, and in harmony with common sense, that if man is the result of natural, mechanical, cosmical forces, then it must follow that he cannot have a will and he cannot know whether it is free or not."

It may be pointed out that this enquiry leads direct to practical issues. On the one side there is presented to view the method of Christ as it can be applied to the Bible, to the nature of man, and even to the universe. Matter, energy, the realm of light, and every power in nature, testify that they are so ordered, planned, and designed; that they reveal and are in unison with the Divine will; that they harmonise in all their diversities with the method of Christ; and that their vibrations or motions have a universal spiritual application. The psychical is in harmony with the physical; and the physical is the form to which the psychic conforms in all its images and thoughts. The psychic is

the link betwixt the physical and intellectual and moral, the image of God in man; and it is this spiritual nature that is truly man, as revealing and interpreting the thoughts of God. There is a vision as of an awful catastrophe; and the physical, psychical and spiritual are seen as a chaos, a ruin. There appears the Lord Christ, the Saviour, the Sacrifice for sin, Redeemer of His brethren, and the Holy Spirit reveals, interprets to men, by the word of God, that Christ is the faithful and true witness to men of His Father's will for their salvation. Christ is thus revealed by the Holy Spirit to spiritual men, by a spiritual method; and the method and the Man are found to be in perfect harmony.

Let men glance for a moment at the power that would dethrone God, reject Christ, do despite to His Spirit of grace, take from them freedom of will and every hope of salvation or eternal life, and what do they see? The picture is not a pleasant one; it takes the form of the alchemist as magician with his fantastic robes and mystic wand; and the results attained from the incantations uttered, are a mysterious, self-evolved, natural, mechanical universe without method; a thing about which men cannot agree; and that could never satisfy the desires of men who love truth and righteousness. There is another aspect in which this magician may be studied, and it is when he presents himself in lighter mood with the cap and bells upon his head. He becomes an amusing agnostic, one who imbibes sceptic thoughts as if they were his mother's milk, boasts of their nutritive power, makes stale jokes about everything pure or sacred, and goes out of his way to make people laugh at the stories to be found in the Word of God. Are these pictures caricatures? Is there truth in what they represent? They treat too lightly what is so grave and reprehensible; the magician is a charlatan, a dupe of the devil, and a deceiver of men; he has departed from the fear of God, and from the laws of truth and righteousness. The house that God is building he would destroy; and in its place he would put that other shadow and sham of a thing evolved from the erratic conceptions of men, who are without God, and without hope of the life eternal. The position is far more grave than people imagine; they do not realise the great crisis that is come; they seem to have given themselves over to pleasure, naturalism and materialism. There is at least one parallel in history of a similar kind, and it is to be found in the Jewish high priest who condemned Christ to death. It is stated that he told the Jews that they knew nothing, and that it was expedient that one man should die so that the nation should not perish. The know-nothings—agnostics—did as they were told by

their high priest, the Man died, and the nation of the Jews was scattered abroad over the face of the earth. The high priest of science and philosophy has now uttered his dark saying, and in it he has doomed God, freedom and immortality to death; the know-nothings—agnostics—rejoice and praise their leader; and the masses of men move onward not knowing that this curse is overshadowing them, and that the imprecation of this high priest is upon them. If Jews and Christians do not arouse themselves to seek God by Christ, and His method of life, it may be affirmed that just as surely as the Roman power destroyed Jerusalem, so the day will come when they will awake to find that God has left them; that their freedom is gone for ever, and that an awful darkness, as of death, reigns in their midst. Is it not an ominous sign that Jews and Christians should hear such utterances and treat them as if they were of no consequence? By their apathy they seem to be saying, it is a matter of indifference to us whether God is dead or alive, we are getting on very well without Him, and possibly it might be as well if He were dead so that we might do what we please. With the agnostics—the know-nothings—it is a time of rejoicing; they seem really to think that the seer of Jena has destroyed the thought of God, and they try to be happy and make believe that the world is so much pleasanter to live in since they came to their inheritance. But when God goes then farewell freedom, that sacred possession for which men of many nations have willingly died. Let the Christians ask the Jews how it has fared with them since their temple was destroyed, their city walls razed to the ground, their forefathers put in chains and sold in the market place like cattle; and how they have suffered agonies and iniquities innumerable during the past nineteen centuries? Even now men born free seem to despise their birthright; and it is openly said that they have become so apathetic to freedom and liberty, truth and righteousness, that they are ready to become enslaved. It is hinted that every party in the state seeks its own ends, and that none are left free to seek the good of the common-weal. It is boldly asserted that rulers have become despotic in using the power with which they have been entrusted; that they seek the good of their own friends and families and classes, and that they have traitorously sold the interests of the people they represent. Can it be true that governments are merely trusts, great combinations led by unscrupulous men who seek their own interests, places for their friends, advantages for the classes they represent, and that every scheme they produce—which may seem to have a purpose of liberty, freedom, and what

will be for the good of the common-weal—is, in reality, so trammelled with nomineeism and legal conditions, that their schemes are meant to be huge deceptions on the public, and the very means by which the masses shall remain enslaved; and they shall continue to govern, holding the reins of power and reaping the rewards? No God, no freedom and no immortality is the utterance from Jena; and men may well be startled by the thought that it is possible that the question of spiritual life and the life eternal is hanging in the balance and almost decided. Men may look to the Church of God for guidance, and what do they see? The flock of the Good Shepherd dispersed, scattered abroad, wandering everywhere, trying to protect themselves from the wolves that destroy. Can it be true that the under-shepherds have become the wolves that make the sheep of the flock their prey? That instead of following in the footsteps of their Lord and Master, they are ambitious for distinctions and honours, avaricious, unscrupulous tricksters who live for this world and its glories, for temporal things, and have forgotten the method of Christ with its high, spiritual, self-denying and self-sacrificing principles? Even thus, it is said, the great masses of men judge and condemn those who rule in the church or churches; and they are ready to say religion is all sham, a base, false means of making the best of the things of this life, and men who do so cannot have any real belief in God, Christ, true religion or the life immortal.

These are grave thoughts, and they show that it is time for men to ponder seriously over the words that have come from Jena. There is, however, another aspect of this judgment as to God, freedom and immortality that ought to be studied. Here, without doubt, is the final conclusion of this man's thoughts after scrutinising the universe of thought. Other men may object, scoff at, deride, despise, or even turn with disgust from such a conclusion, but to him this is truth; he can see no other solution to the riddle, and, apart from his views, all is darkness. What is the vision? This man strenuously climbed the mountain side with other men; he reached the top of the heights which only few men reach; he surpassed them all and stood upon a point where he saw all things and all kingdoms in their glittering glory; and all these were offered to him if he would only bow the knee and worship the power that claimed authority over them. The knee was bent; the glittering glory vanished; the foul fiend shrieked with delight; the awful night and darkness fell upon the man, and from that moment God, freedom and immortality were lost. The vision is true—an awful truth

for any individual; and truly God only can reverse the vision, reveal Himself, and give to wanderers in the darkness freedom and the life eternal.

Is this the end of the vision, the myth, the story of the temptation and fall of man in Eden? Man was endowed with all things, with one reservation, "the fruit of the tree which is in the midst of the garden"; and to touch or eat this fruit meant death. Nay, was the response of the subtle serpent: it does not mean death, it means knowledge, open eyes, what is good and pleasant, and what will make for wisdom. Man sinned; the seed of the fruit fell into the ground; in the earthly, the tree has developed, and the seed has again brought forth its fruit. The eyes of men are now being opened to see the issue of the story of Eden, and they behold a deadly upas tree that poisons and destroys life. The fang of the serpent has gone home, and its deadly poison has reached head and heart. Let thoughtful men ponder over these words, "the highest intellectual progress definitely rules out the three central dogmas of metaphysics—God, freedom and immortality." This is the glory of the agnostic evolution vision; a world without God; man the bond-slave of mechanical materialism, and the end death. The past darkness, the present bondage, the future the grave, and the outer, hopeless darkness. Let no man say this is the fruit of science; it is not so. Science comes to men as the double-edged sword of the Spirit; and it has yet to be seen what light science will throw upon these questions.

It is in the light of the truth in Christ that men can see these things. On the one hand the seer of Jena is seen sitting in the awful darkness without God or hope; and all the avenues of worldly thoughts, great ambitions, godless aspirations and universal intellectual sovereignty lead men to that centre. On the other side men see the Divine Son of God, the Saviour of men in His glory, radiant in light, exultant in life, and immortal in love. He lives, and men live in Him, for He is their life. He reveals God to men; He grants to them spiritual freedom, and this covers every form of freedom worthy of possession. The way to the life eternal, to immortality, is to be found by spiritual illumination, by knowledge of, and obedience to, Divine Law, and this is known as the Method of Christ.

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